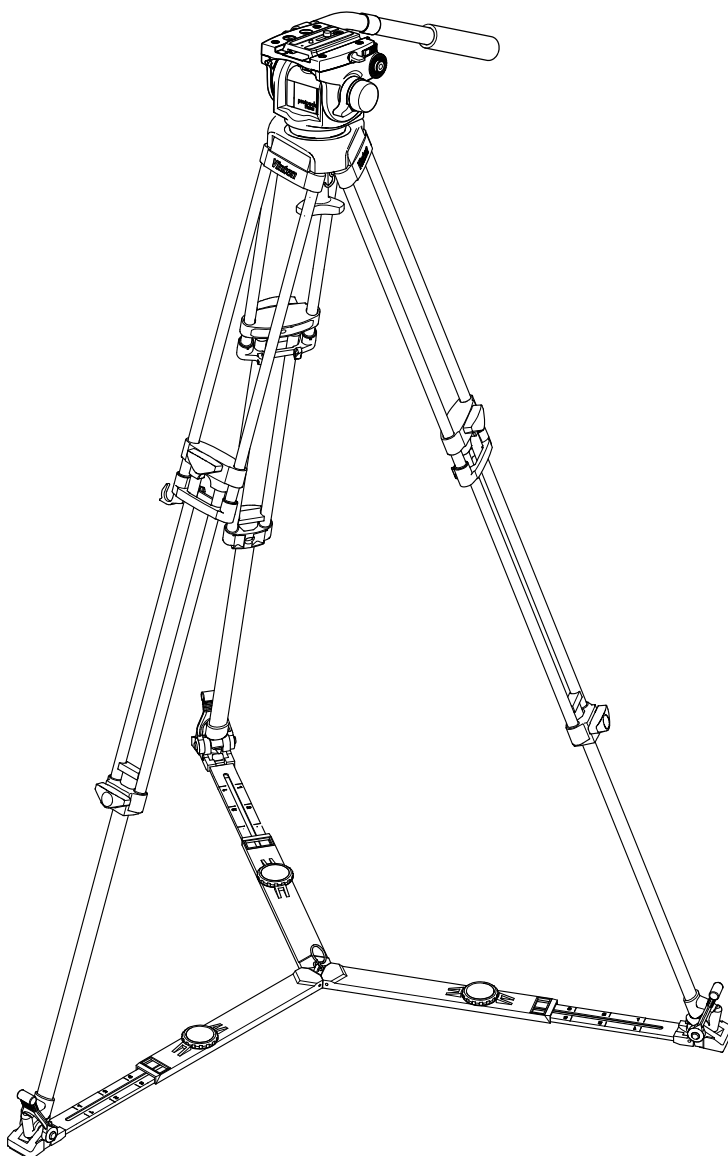




Protouch



Pro-6^{HDV} System



Maintenance Manual



Protouch Pro-6^{HDV} System

MAINTENANCE MANUAL AND ILLUSTRATED PARTS LIST

PUBLICATION PART No.V4018-4990

ISSUE 1 (October 2008)

Original Instructions

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Foreword

This manual provides full and detailed maintenance and spare parts information for the Vinten® Protouch Pro-6^{HDV} system, comprising a Pro-6^{HDV} pan and tilt head, a Pozi-Loc tripod, floor or mid-level spreader and case.



WARNING!: Read the Safety Section on [page 5](#) before using this pan and tilt head and tripod or attempting any adjustment or repair.

It is recommended that this manual is read carefully and the illustrations studied prior to operating or servicing the equipment. Attention to the details contained herein will ensure that the equipment will operate efficiently with the minimum of attention over a long service life. Particular attention must be paid to cleaning, especially after use in adverse conditions.

To order spare parts or to obtain further information, application should be made to Vinten or to your local distributor, or visit our website at www.vinten.com.

NOTE: Information contained in this document is subject to change.
Vinten reserves the right, without notice, to make changes in equipment design or performance as progress in engineering, manufacturing or technology may warrant.

Associated Publication

Protouch Pro-6^{HDV} System Operators Guide
Publication Part No. V4018-4980



Notes to readers

This is the on-line version of 'Protouch Pro-6^{HDV} System Maintenance Manual' (V4018-4990). Readers should be aware that the pagination differs between on-line and printed versions.

Navigation

Clicking the mouse on any [blue text](#) will move you around the document. For example, if you click on one of the blue call-outs on an exploded drawing, you will be taken to the appropriate line in the relevant parts list.

[Contents](#)

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Clicking here will take you to the first page.



Clicking here will take you to the previous page.



Clicking here will take you to the next page.



Click here to go back to the previous view.

Alternatively, you may use the Acrobat Reader navigation buttons.



Safety - Read This First!

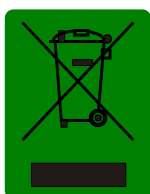
Warning symbols in this maintenance manual



Where there is a risk of personal injury or injury to others, comments appear highlighted by the word **WARNING!**—supported by the warning triangle symbol.

Where there is a risk of damage to the product, associated equipment, process or surroundings, comments appear highlighted by the word **CAUTION!**

Disposal of old electrical and electronic equipment



This symbol on the product or on its packaging indicates that this product must not be treated as household waste (applicable in the European Union and European countries with separate collection systems). It shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment. Please visit www.vinten.com/recycle for details.

By ensuring this product is disposed of correctly, you will help prevent potentially negative consequences for the environment and human health, and help conserve natural resources.

Disposal of waste batteries

Any batteries included with this product must not be treated as household waste (applicable in the European Union and European countries with separate collection systems). By ensuring these batteries are disposed of correctly, you will help prevent potentially negative consequences for the environment and human health, and help conserve natural resources. Please view the section on how to remove the battery from the product safely. Hand the battery over to the applicable collection point for recycling waste batteries. Please visit www.vinten.com/recycle for details.



Usage

The Pro-6^{HDV} System has been designed for television camera operators to support and balance a camera and ancillary equipment weighing up to 16 kg (13.2 lb).



WARNING!: 1. Do NOT attempt to use this product if you do not understand how to operate it.

2. Do NOT use this product for any other purpose than that specified in the Usage statement above.

3. Maintenance must be performed only by competent personnel in accordance with the procedures laid down in this Maintenance Manual.

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Abbreviations

The following abbreviations are used in this publication:

ac	alternating current	lb	pound (weight)
A	Amps	LF	Lubricated Friction
AF	across flats	LH	left hand
A/R	as required	MISO	metric thread
ASME	American Society of Mech Engineers	m	metre
assy	assembly	mm	millimetre
BS	British Standard	N	Newton
BA	British Association thread	NPT	National Pipe thread
BSF	British Standard Fine thread	NI	not illustrated
BSP	British Standard Parallel Pipe thread	No.	number
BSW	British Standard Whitworth thread	OD	outside diameter
btn	button	PCB	printed circuit board
chs	cheese	PCD	pitch circle diameter
C of G	centre of gravity	pozi	Pozidrive
comp	compression	psi	pounds per square inch
csk	countersunk	pt	point
cu	cubic	PTFE	Polytetrafluoroethylene
c/w	complete with	PVC	Polyvinyl chloride
dc	direct current	RH	right hand
dia	diameter	sect	section
ft	foot	skt	socket
hd	head	SWG	standard wire gauge
hex	hexagon	thk	thick
Hz	Hertz (frequency)	UNC	Unified Coarse thread
IC	integrated circuit	UNF	Unified Fine thread
ID	inside diameter	V	Volts
in.	inch	W	Watts
kg	kilogram		



Technical Specification

Pro-6^{HDV} pan and tilt head

Weight

Head with bowl clamp	1.95 kg (4.29 lb)
Pan bar	0.25 kg (0.55 lb)
Height to mounting face	12.4 cm (4.9 in.)
Length	12.2 cm (4.8 in.)
Width	17.5 cm (6.9 in.)
Load capacity	6 kg (13.2 lb)
Tilt range	+90° -60°
Pan range	360°
Tripod fixing	75 mm ball

Pozi-Loc tripod

Levelling bowl diameter	75 mm
Maximum height with floor spreader	156.2 cm (61.5 in.)
Minimum height with floor spreader	41.6 cm (16.4 in.)
Maximum height with mid-level spreader	155.6 cm (61.26 in.)
Minimum height with mid-level spreader	53.6 cm (21.1 in.)
Weight	3.2 kg (7.0 lb)
Transport length	71 cm (28.0 in.)
Recommended maximum load	25 kg (55 lb)

Floor spreader

Maximum leg radius	77 cm (22.5 in.)
Minimum leg radius	38 cm (15 in.)
Weight	0.7 kg (1.5 lb)

Mid-level spreader

Maximum spreader radius	97.7 cm (38.4 in.)
Minimum spreader radius	16.2 cm (6.3 in.)
Weight	0.48 kg (1.05 lb)



Design Improvements

DETAILS	SERIAL No. INFORMATION
Improvements to tripod bottom clamp adjuster	Tripod 3819-03515

Section 1

Introduction and Description

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Introduction

1 There are two Protouch Pro-6^{HDV} systems from Vinten. Both systems comprise of a Pro-6^{HDV} pan and tilt head, a Pozi-Loc two-stage tripod and a soft case. However, one system (Pro-6 HDVF) is supplied with an adjustable floor spreader and the other (Pro-6 HDVM) comes with an adjustable mid-level spreader.

Description

Pro-6^{HDV} pan and tilt head

2 The Pro-6^{HDV} pan and tilt head (Fig 1.1) is designed to support the latest professional digital video cameras, up to 6 kg (13.2 lb) in weight. It embodies fluid drag assemblies for pan and tilt motions with brakes on each axis to lock the head in any position. An illuminated levelling bubble is fitted to the rear of the head and a quick-release, side-loading adjustable slide plate is provided for camera mounting. A single fixed pan bar is supplied.

Balance

3 The selectable balance range in the Pro-6^{HDV} pan and tilt head is set for payloads of 2.5 kg (5.5 lb) to 6 kg (13.2 lb) at a centre of gravity (C of G) height of 5.5 cm (2.2 in.). The graph (Fig 2.2) shows the relationship between C of G height and payload for optimum performance.

Pan and tilt drag

4 Both the pan and tilt mechanisms incorporate fluid drag assemblies to ensure smooth movement of the camera about these axes and are fitted with control knobs (3) (14) to adjust the drag setting.

Pan and tilt brakes

5 Brakes (4) (15) on each axis are provided to lock the head in any position

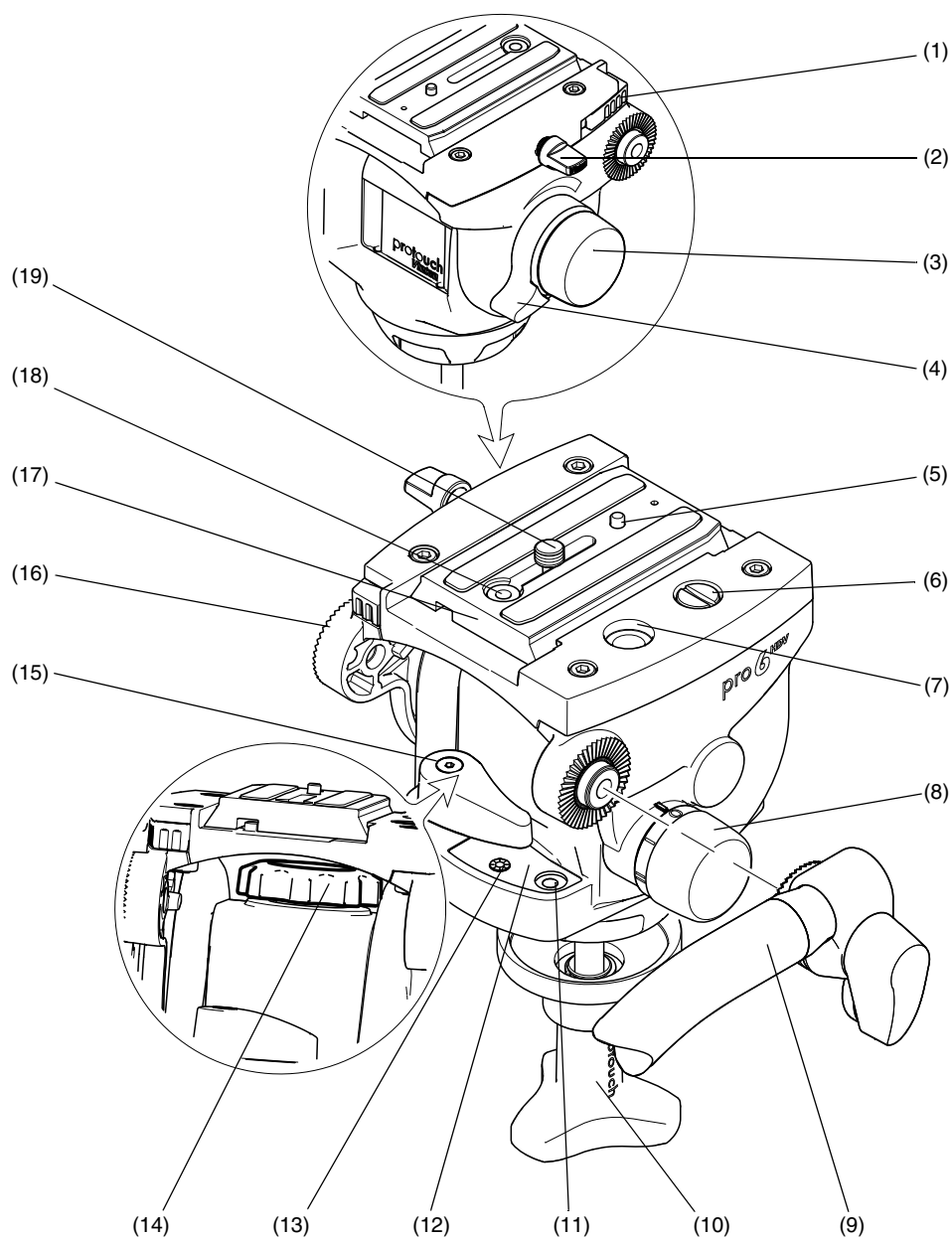


Fig 1.1 Pro-6^{HDV} Pan and Tilt Head

Illuminated levelling bubble

6 To enable the head to be levelled, an illuminated levelling bubble (11) is fitted to the rear of the head. When the switch (13) is pressed, the bubble will be illuminated for approximately 15 seconds. The battery for the illuminated bubble is contained in a illumination module (12). The switch (13) will illuminate when the battery needs replacing.

Camera mounting

7 The camera is attached to the head by means of a slide plate (17), which is provided with a spring-loaded locating pin (5) and 1/4 in. (6) and 3/8 in. (19) screws. When not in use, the screws are stowed in the camera mounting platform (7). The slide plate (17) is loaded from above into the side-loading clamp mechanism, and a clamp (2) is provided to hold the slide plate in position. The release button (1) allows removal of the slide plate (17) from the head.

Pan bar

8 Pan bar mounting points (16) are located at the rear of the head, on either side of the camera mounting platform. The pan bar (9) is attached using a pan bar clamp, with angular adjustment available on the mount serrations. A single fixed pan bar (9) is supplied. A second pan bar may be fitted.

Pozi-Loc tripod

9 The Pozi-Loc two-stage tripod (Fig 1.2) has aluminium legs and a 75 mm levelling bowl (20). It is fitted with the highly-efficient Pozi-Loc leg clamp (21), which provides quick set-up and easy adjustment.

Tripod spreaders

10 Depending on which Pro-6^{HV} system was purchased, the tripod is supplied with either a floor spreader (Fig 1.2) or a mid-level spreader (Fig 1.3). Both tripod spreaders increase the rigidity of the tripod.

Pro-6 HDVF system

11 The Pro-6 HDVF system utilizes a floor spreader (Fig 1.2) which, being flexible, compensates for uneven ground, protects floors and carpets and prevents the tripod legs sinking into soft ground. It should be used at all times.

NOTE: Always use the spreader where possible as this increases rigidity of the tripod. Being flexible, the spreader compensates for uneven ground. It can be removed and a dolly fitted.

At the fullest extension of the spreader and with all legs fully retracted, the tripod can be used at its lowest operating height. Although the tripod can be set up lower than this without the spreader, it is NOT recommended as the tripod geometry becomes unstable

12 Each arm of the spreader is adjustable for length (23) and the tripod feet are secured by rubber straps (24).

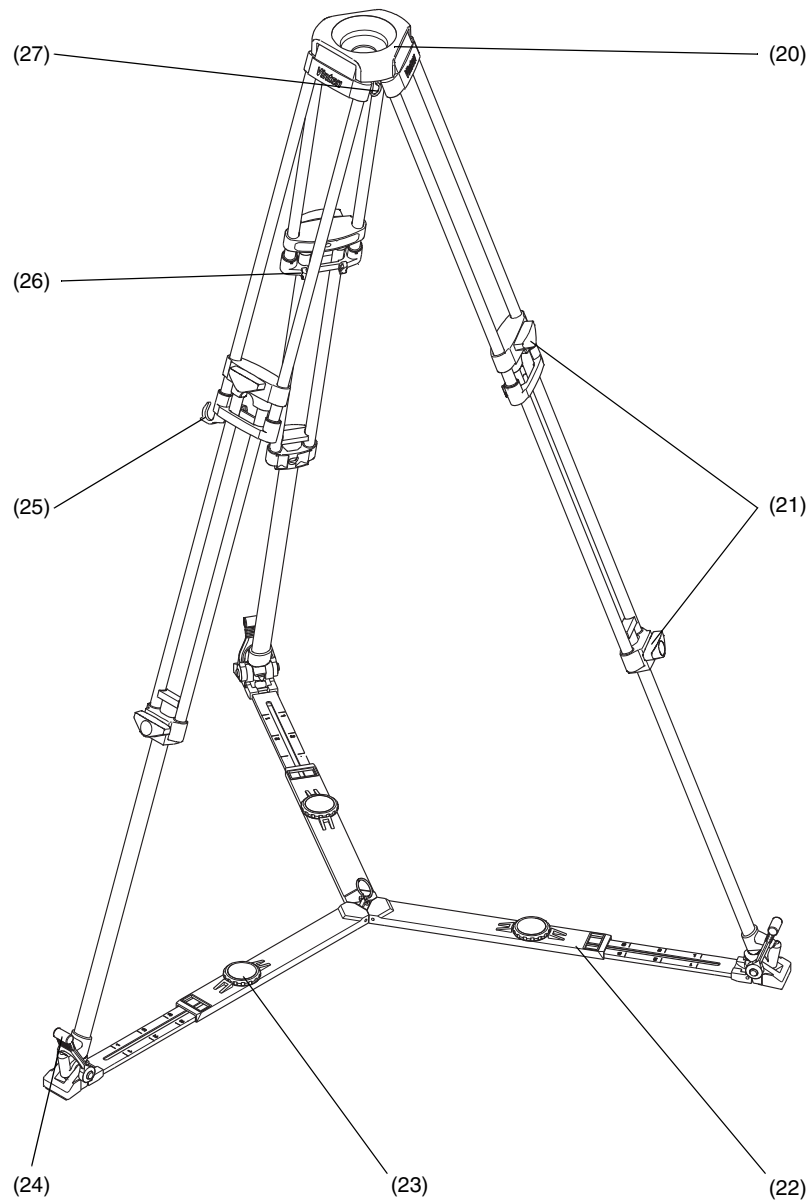


Fig 1.2 Pozi-Loc Tripod and Floor Spreader

Pro-6 HDVM system

13 The Pro-6 HDVM system utilizes a mid-level spreader (Fig 1.3) which fastens to the attachment points (26). There are two spread settings, controlled by a knob (28), and the arm lengths can be adjusted using the extension clamps (29) to compensate for uneven ground. A set of three feet (32) are also supplied with this

system to protect floors and carpets and prevents the tripod sinking into soft ground. The feet are secured to the tripod by rubber straps (33).

NOTE: Always use the spreader where possible as this increases rigidity of the tripod. Adjustable extension clamps compensate for uneven ground. The spreader can be removed and a dolly fitted.

At the fullest extension of the spreader and with all legs fully retracted, the tripod can be used at its lowest operating height. Although the tripod can be set up lower than this without the spreader, it is NOT recommended as the tripod geometry becomes unstable

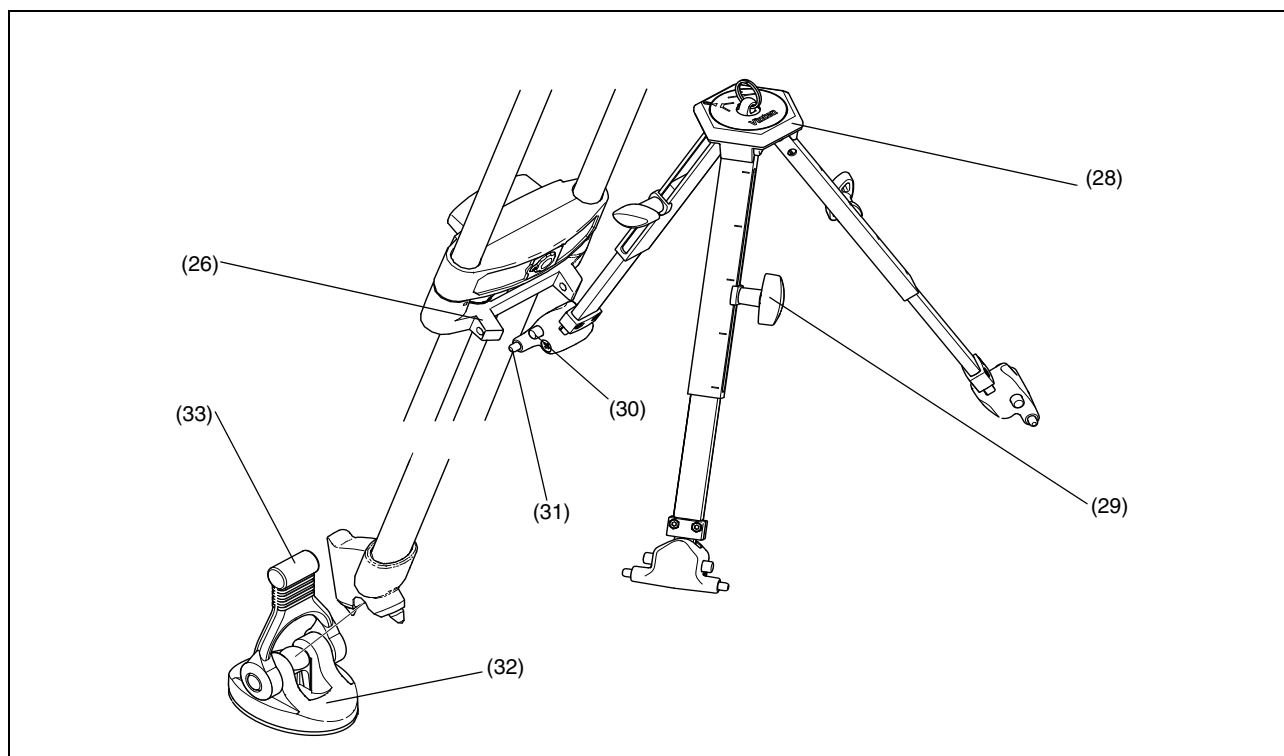


Fig 1.3 Pozi-Loc Tripod and Mid-level Spreader

Section 2

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General

- 1 To identify components, please refer to [Fig 1.1](#) and [Fig 1.2](#) and [Fig 1.3](#)

Assembly

- 2 If not already done, assemble the system as follows:

Tripod and floor spreader

- 3 To install the floor spreader [Fig 1.2](#):
 - 3.0.1 Lift the tripod out of the case using the finger holes just below the top clamps.
 - 3.0.2 Release the leg tie strap [\(25\)](#) and spread the legs.
 - 3.0.3 Secure the spreader to the tripod feet with the rubber straps [\(24\)](#).

NOTE: Once assembled, keep the spreader attached to the tripod

- 4 To adjust the tripod:
 - 4.1 Adjust the operating height by undoing the leg clamps [\(21\)](#) and pulling the tripod up to the desired height. Adjust the spreader [\(23\)](#) if necessary.
 - 4.2 Tighten the clamps [\(21\)](#) until an audible click is heard and the knob is in the horizontal, locked position.
 - 4.3 In adverse conditions secure the tripod using the tie-down hook [\(27\)](#), or suspend a weight from the hook.



WARNING!: Stability is reduced when the tripod is fully extended with the floor spreader in the closed position. Use with care.

Tripod and mid-level spreader

5 To install the mid-level spreader (Fig 1.3):

- 5.1 Grip the ends of each spreader arm in turn between thumb and fore-finger and press in both attachment release buttons (30).
- 5.2 Push the arm into the tripod attachment (26) ensuring the attachment pins (31) engage.
- 5.3 Secure the carpet feet (32) onto the tripod feet using the rubber straps (33).

NOTE: The carpet feet attach using rubber straps in the same way as the floor spreader (23).

- 5.4 To remove the spreader, press in the attachment release buttons (30) and free each arm in turn.

6 To adjust the mid-level spreader:

- 6.1 There are two spread settings. To select maximum (flat) spread, lift the spreader centre moulding such that lugs can pass the extension arms, and rotate the spread knob (28) fully clockwise. To select minimum (60°) spread, lift the spreader centre moulding and rotate the spread knob (28) fully anticlockwise.

NOTE: The spread knob (28) will not rotate when the spreader is loaded. Lift the spreader centre moulding to allow the knob (28) to rotate freely. A pointer on the knob (28) indicates maximum or minimum spread setting.

- 6.2 Extension arms can be individually adjusted by releasing the extension clamps (29), extending the arm as required and re-tightening the clamp (29).

NOTE: Do NOT attempt to fold the tripod if the spreader extension arms are uneven lengths. The spreader may be damaged. Set all extension arms to the same length (29) and then fold the tripod.

7 To adjust the tripod:

- 7.1 Adjust the operating height by undoing the leg clamps (21) and pulling the tripod up to the desired height. Adjust the spreader (29) if necessary.
- 7.2 Tighten the clamps (21) until an audible click is heard and the knob is in the horizontal, locked position.

7.3 In adverse conditions secure the tripod using the tie-down hook (27), or suspend a weight from the hook.



WARNING!: Stability is reduced when the tripod is fully extended with the floor spreader in the closed position. Use with care.

Pan and tilt head

8 The Pro-6^{HDV} pan and tilt head (Fig 1.1) is supplied with a 75 mm ball mount. Adaptors are available which enable the head to be installed on tripods or pedestals fitted with other mountings. These are listed under 'Optional Accessories'.

9 To install the head, remove the bowl clamp assembly (10) from the head, position the head on the tripod and refit the bowl clamp assembly from below. Level the head with the aid of the level bubble (11) and tighten the bowl clamp (10). The level bubble may be illuminated by pressing the switch (13). The light will extinguish after approximately 15 seconds.

NOTE: After unpacking the product, to initially illuminate the level bubble, a paper transportation tab must be removed from the battery. To access the battery, see 'Battery replacement' on page 26.

Mounting the camera

10 Remove the slide plate (17) from the head (Fig 1.1) by releasing the slide plate clamp (2), pressing the slide lock release (1) and lifting the plate upward.

11 Install the required camera fixing screw (6) or (19) in the slide plate and retain with the rubber bung (18). Stow the unused screw in the appropriate stowage (7) in the platform.

12 Attach the slide plate (17) to the camera or camera mounting plate under the approximate centre of the camera's weight using the fixing screw (6) or (19) and locating pin (5) (if appropriate).

13 Set the platform level and apply both the pan (15) and tilt brakes (4).

14 Lower the camera onto the platform (Fig 2.1) ensuring that the edge of the slide plate opposite the slide clamp engages first, and then push downward so the slide clamp 'snaps' into position.

15 Tighten the slide plate clamp (2).

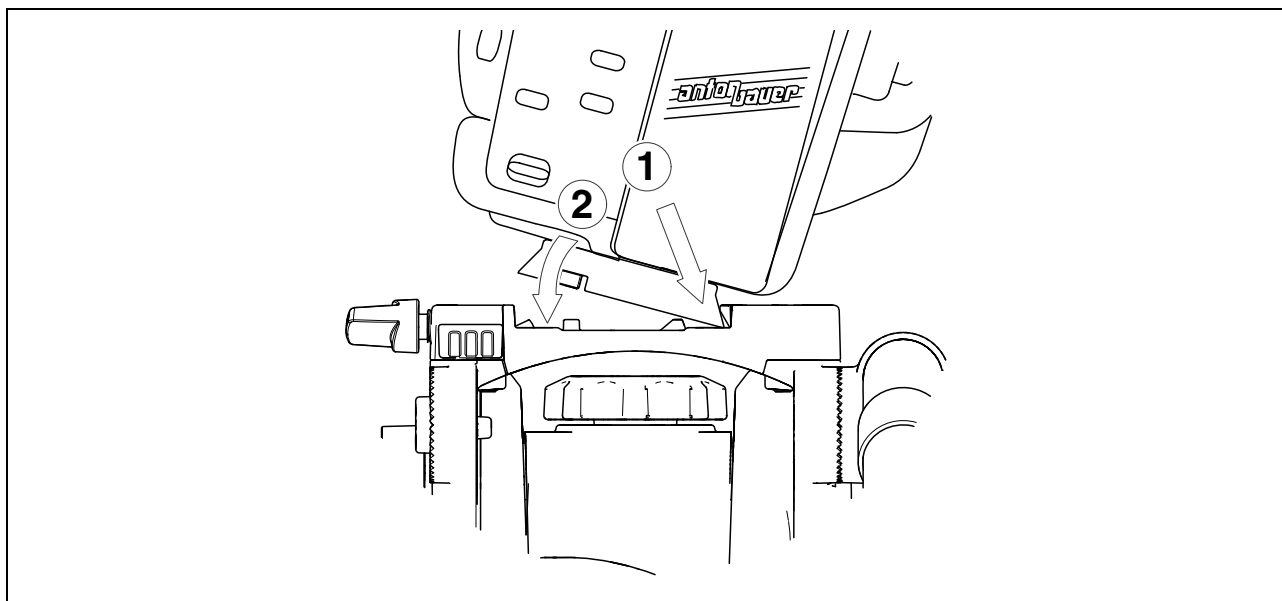


Fig 2.1 Mounting the camera

Checking camera balance

16 The Pro-6^{HDV} head provides a selectable balance range, set for payloads of 2.5kg (5.5lb) to 6kg (13.2lb) at a centre of gravity (C of G) height of 5.5cm (2.2in.). The graph (Fig 2.2) shows the relationship between C of G height and payload for optimum performance.

17 The balance selector (8) allows four balance levels to be utilized. Level '0' offers free rotation of the tilt axis with no counter-balance engagement. Levels '1' to '3' offer gradually increasing balance capacity (Fig 2.2).

NOTE: When changed, the selected balance level (8) engages as the platform moves through the horizontal position.

18 Check the camera balance as follows, remembering to ensure that the pan bar(s) and any ancillary equipment have been fitted:

19 Reduce tilt drag (3) to level '1'.

CAUTION! Support the camera with one hand before releasing the tilt brake (4). An out of balance payload can fall away suddenly.

20 Release the tilt brake (4).

21 Position the camera correctly on the head by releasing the slide plate clamp (2) and sliding the camera backwards or forward until it balances horizontally. Apply the slide plate clamp (2).

22 Using the pan bar (9), tilt the head backwards and forwards. If the head tends to fall away, select a higher balance level (8). If the head tends to spring back, select a lower balance level (8).

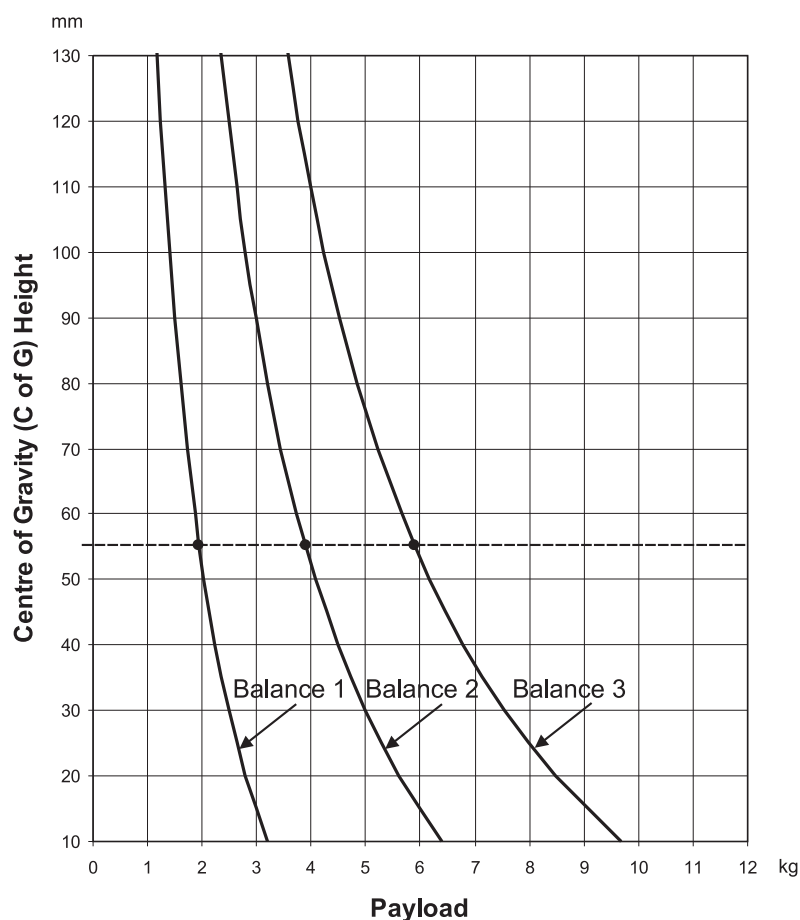


Fig 2.2 Balance graph

Pan and tilt brakes

23 Brakes on each axis allow the head to be locked at any chosen position. The operating lever for the pan brake (15) is at the rear of the head. The tilt brake (4) is operated by a lever on the left-hand side of the head.

24 To apply the pan brake, turn the lever (15) fully clockwise. To release the brake, turn the lever counter-clockwise.

25 To apply the tilt brake, turn the lever (4) fully counterclockwise. To release the brake, turn the lever clockwise.

CAUTION! DO NOT use the brakes to supplement drag.

When the brakes are not in use, always ensure they are fully released to avoid damaging the product.

Pan and tilt drag

26 Both the pan and tilt mechanisms incorporate a fluid drag system to ensure smooth movement of the camera about these axes.

27 The tilt drag adjustment knob (3) is on the left -hand side of the head, the pan drag knob (14) is on the top of the body, beneath the platform.

28 To increase drag, turn the appropriate knob clockwise. To decrease drag, turn the knob counter-clockwise.

NOTE: Reduce drag to a minimum when the head is out of use for long periods.

Optional equipment

Carrying strap

29 A carrying strap (34) (Fig 2.3) (Part No. 3425-3P) is available as an optional accessory and is installed as follows:

29.1 On the lower moulding of the leg with the strap, drive in the 'knock-out' (25.1) using a suitable tool. If possible, remove the blank from inside the moulding to prevent subsequent rattle.

29.2 Push a blind captive nut (34.4) into the hole in the lower moulding.

29.3 Using a suitable M5 screw, fully compress the blind captive nut. Remove the M5 screw.

29.4 Install a washer (34.3) on the lower strap anchor (34.2) and screw into the captive nut (34.4). Ensure that the hole in the strap anchor is oriented so that the karabiner (34.1) can be attached.

29.5 On the underside of the tripod bowl (20), remove and discard the screw (34.5) securing the corresponding leg clamp (20.2). Do not remove the washer (20.1).

29.6 Position the bowl strap anchor (34.6) on the leg clamp, ensuring it is correctly oriented. Using Loctite 221, secure the bowl strap anchor with the 25 mm M6 screw (34.5) supplied with the strap. Tighten screw to a torque of 4.5 Nm (40 lbf in.).

29.7 Using the karabiners (34.1), clip the strap (34) to the strap anchors and adjust to length.

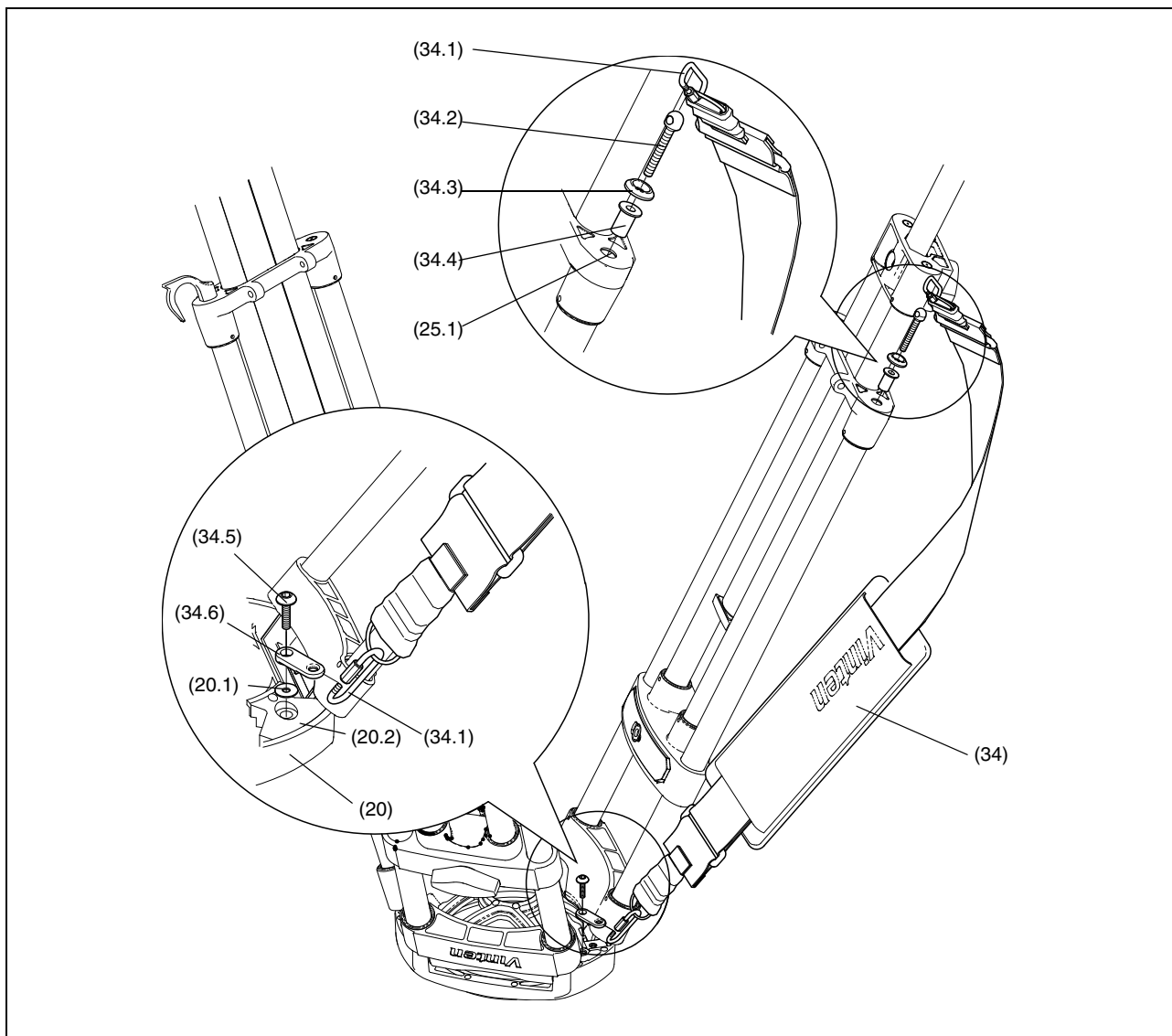


Fig 2.3 Carrying strap installation

Dollies

30 The Pro-6^{HDV} system may be mounted on a variety of OB and studio dollies as follows:

PD114 dolly	U005-103
ENG (OB) dolly	3319-3B
ENG (Studio) dolly	3319-3C
ENG (OB) dolly - small	3319-3ST



Section 3

Tools and Materials

Special tools

- 1 No special tools are required.

Consumable materials

NOTE: Adhesives and lubricants are not supplied and should be obtained under local arrangements.

- 2 The following consumable materials are required for certain procedures detailed in Sections 4 and 5.

Item	Use
AGIP PV (NLGI 2) grease (white)	General lubrication
Kluberlub BE41-501 grease (black)	General lubrication
Shell Darina R2 grease (yellow)	General lubrication
Arexon TT163	General lubrication
Optalus A0 140	Pan and tilt friction
Chesterton 622	Tripod clamps
Loctite 221 (Vinten Part No. Z002-026)	Screw locking



WARNING!: Always follow the recommended handling instructions supplied with each consumable material product.

Section 4

Servicing

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General

1 Protouch products are robustly made to high engineering standards and little attention is required to maintain serviceability save regular cleaning. Attention to the following points will ensure a long and useful service life with minimum need for repair.

Cleaning

2 During indoor use, the only cleaning required should be a regular wipe over with a lint-free cloth. Dirt accumulated during storage may be removed using a semi-stiff brush. Particular attention should be paid to the ball mounting face of the head, the space between the tilting assembly and the base and the mounting bowl of the tripod.

3 Use out-of-doors under adverse conditions will require special attention. Salt spray should be washed off with fresh water at the earliest opportunity. Sand and dirt acts as an abrasive and should be removed using a semi-stiff brush or vacuum cleaner.

NOTE: Use only detergent-based cleaners. DO NOT use solvent- or oil-based cleaners, abrasives or wire brushes to remove accumulations of dirt, as these damage the protective surfaces.

Routine maintenance

4 During use, check the following:

- 4.1 Check the illumination of the level bubble. Replace battery if the switch (13) is illuminated red.
- 4.2 Check the effectiveness of the pan brake. Reset as necessary.
- 4.3 Check the effectiveness of the camera slide plate clamp. Reset as necessary.
- 4.4 Check the effectiveness of the tripod leg clamps. Reset as necessary.

4.5 Check for ageing and cracking of the rubber foot securing straps on the spreader and renew if necessary.

5 No further routine maintenance is required.

Battery replacement

6 The battery illuminates the level bubble (11) when the switch (13) is pressed. The level bubble remains lit for approximately 15 seconds, or until the switch (13) is pressed a second time.

7 The battery should be replaced yearly or when the switch (13) illuminates red to warn of a low battery level.

8 To replace the battery (Fig 4.1):

8.1 Apply the pan brake (15) and remove the illumination module (12) by pressing the retaining tabs (12.1) together from the underside of the head. The illumination module will then lift out of the head.

8.2 Push the battery (12.2) out of the illumination module from behind using a suitable pointer (pen) and dispose of the waste battery responsibly (see [Disposal of waste batteries.](#))

8.3 Push the replacement battery into the illumination module, observing the correct polarity.

8.4 Refit the illumination module (12) into the head. Push downward until it 'snaps' into place.

8.5 Press the switch (13) and ensure that the level bubble (11) is lit for approximately 15 seconds

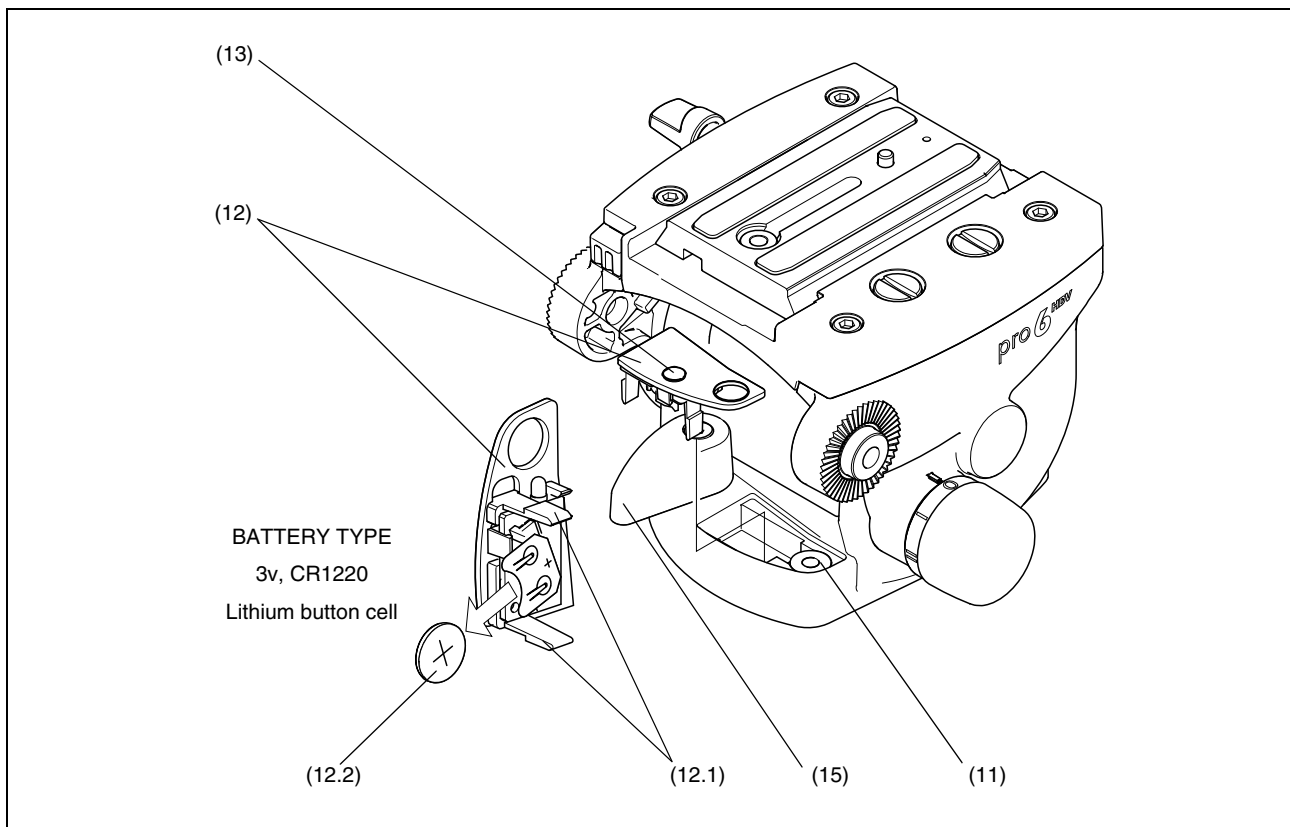


Fig 4.1 Battery replacement

Adjustments

Pan brake knob adjustment

- 9 Because its movement is restricted, the pan brake knob (15) may require adjustment after prolonged use.
- 10 To adjust the pan brake knob:
- 10.1 Remove the securing screw (15.1) and pull the knob (15) off the shaft (15.2).
 - 10.2 Turn the shaft (15.2) clockwise until the pan brake is fully applied.
 - 10.3 Install the knob (15) on the shaft (15.2) approximately at right angles to the body of the head.
 - 10.4 Turn the knob fully counterclockwise and ensure the brake is released. Turn the knob clockwise and ensure the brake is applied before the knob reaches the end of its travel.
 - 10.5 Readjust as necessary and secure the knob with the screw (15.1).

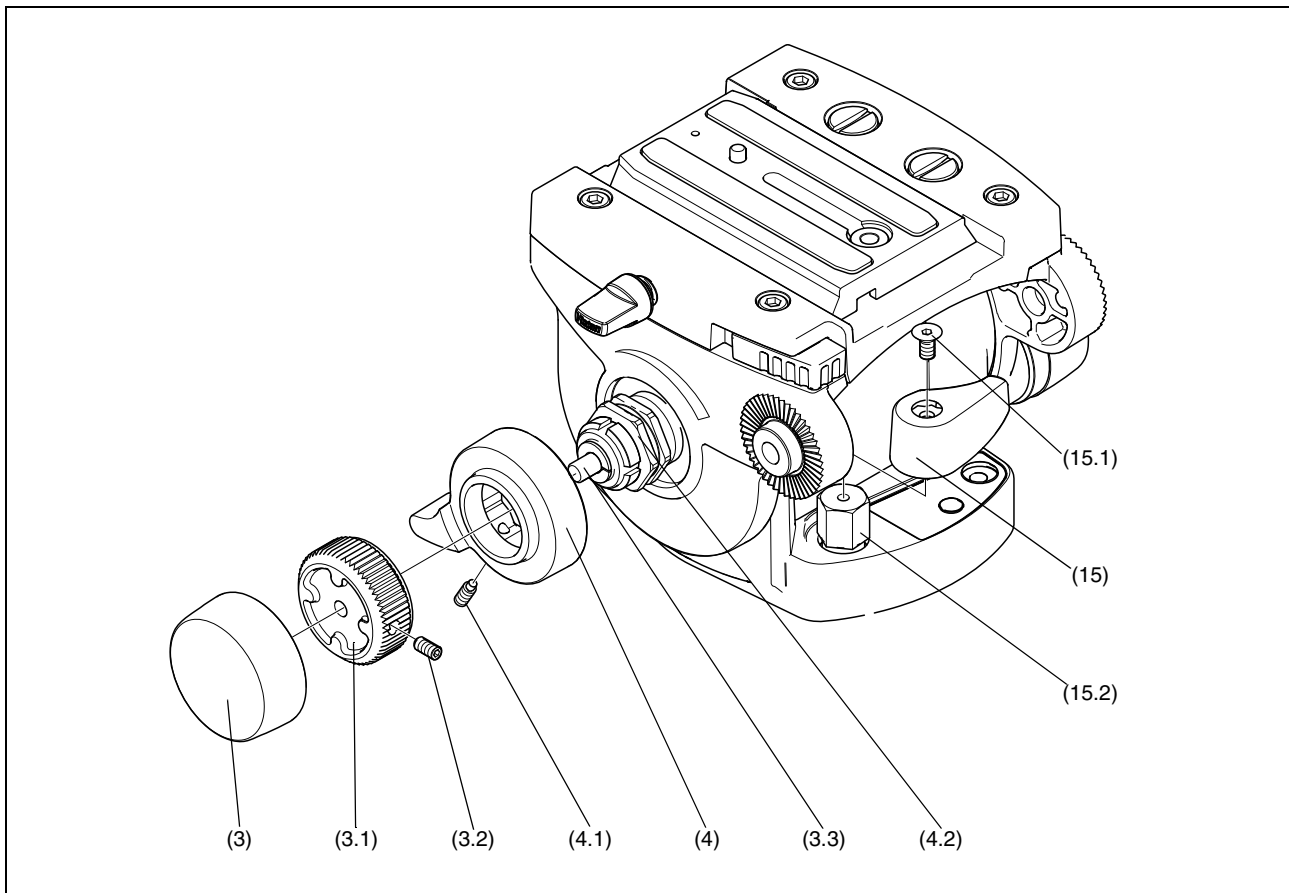


Fig 4.2 Pan and tilt brake knob adjustment

Tilt brake knob adjustment

- 11 Because its movement is restricted, the tilt drag knob (4) may also require adjustment after prolonged use:
- 12 To adjust the tilt brake knob:
 - 12.1 Slide off the rubber tilt drag knob (3) as shown in (Fig 4.2).
 - 12.2 Loosen the drag clamp grub screw (3.2) and remove the drag knob actuator (3.1) from the drag shaft (3.3).
 - 12.3 Loosen the brake clamp grub screw (4.1) and remove the tilt brake knob (4) from the brake shaft (4.2).
 - 12.4 Turn the brake shaft (4.2) counterclockwise until the tilt brake is fully applied.
 - 12.5 Install the knob (4) on the brake shaft (4.2) with the lever approximately 30° - 45° past vertical, pointing downward toward the rear of the head, or as suitable to the operator.
 - 12.6 Turn the knob fully clockwise and ensure that the brake is released. Turn the knob counterclockwise and ensure the brake is applied at a suitable position before the knob interferes with other head controls.
 - 12.7 Readjust as necessary and secure the knob with the clamp grub screw (4.1).
 - 12.8 Refit the drag knob actuator (3.1) onto the drag shaft (3.3) and secure with the clamp grub screw (3.2).
 - 12.9 Push the rubber drag knob (3) back onto the actuator (3.1).

'Pozi-Loc' tripod leg clamp adjustment

- 13 Bedding-in occurs with 'Pozi-Loc' leg clamps, which may necessitate resetting the clamp. Check the effectiveness of each leg clamp as follows:
 - 13.1 Extend all three tripod legs fully and apply the clamp(s).
 - 13.2 Position each leg in turn vertically on a set of weighing scales.
 - 13.3 Gradually apply body weight to the leg until either or both clamps begin to slip. Note the reading on the scales at which this occurs.
 - 13.4 A reading of less than 35 kg (77 lb) will necessitate adjustment.

Top clamp

- 14 Adjust the top clamp as follows (Fig 4.3):
 - 14.1 Turn the clamp knob (21) to the vertical, 'off' position
 - 14.2 Remove screw (21.1). Using a suitable peg spanner, back off the threaded insert (21.2) slot by slot until the leg is free to move under its own weight.

- 14.3 While sliding the leg in and out, gradually tighten the threaded insert (21.2) until the clamp begins to grip.
- 14.4 If not aligned, back off the threaded insert (21.2) until a slot aligns with the hole for screw (21.1).
- 14.5 Back off the threaded insert (21.2) a further three slots
- 14.6 Install screw (21.1) to secure the threaded insert (21.2).

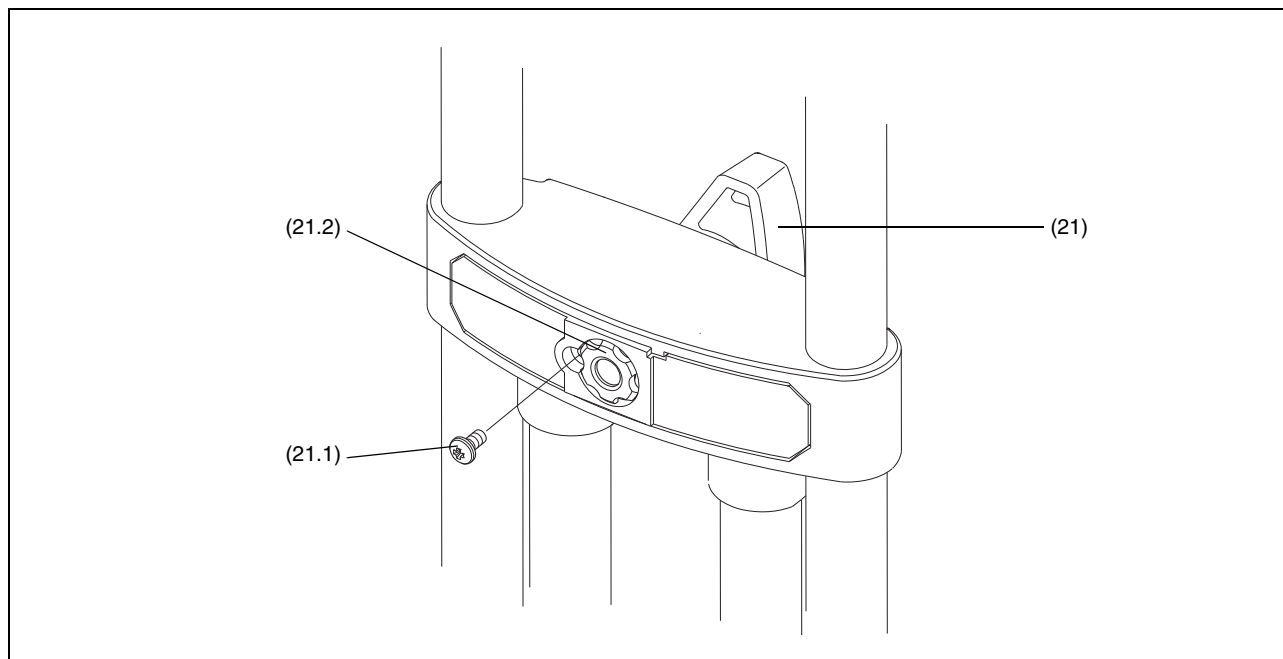


Fig 4.3 Top clamp adjustment

Bottom clamp

- 15 Using a flat-bladed screwdriver, carefully remove the hole plug (21.6) (Fig 4.4).
- 16 Remove the retaining screw (21.5) and washer (21.4), but do not remove the clamp knob (21).
- 17 Rotate the clamp knob (21) to 'position 2' shown in (Fig 4.4), with the edge of the clamp knob (21) vertical. In this position the clamp is NOT fully rotated counterclockwise in the 'off' position.
- 18 Using a 2.5 mm hexagonal wrench, loosen the adjusting grubscrew (21.3) until the leg is free to move under its own weight.
- 19 While sliding the leg in and out, gradually tighten the adjusting grubscrew (21.3) until the clamp begins to grip.
- 20 Rotate the clamp knob (21) fully counterclockwise to the 'off' position and ensure that the leg is free to move under its own weight.
- 21 Secure the clamp knob (21) with the washer (21.4) and retaining screw (21.5). Refit the hole plug (21.6).

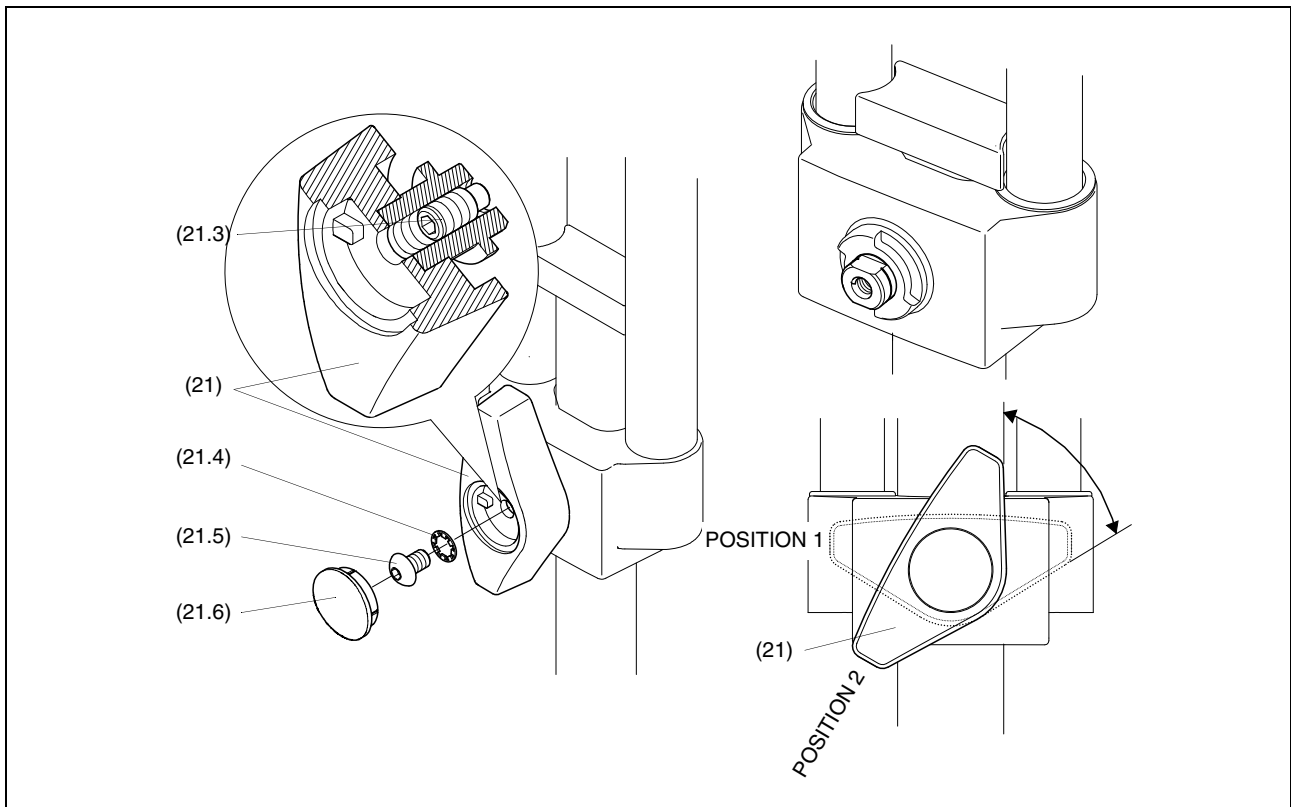


Fig 4.4 Bottom clamp adjustment

Section 5

Repair

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General

1 This section details procedures for disassembly and assembly of the Pro-6^{HDV} pan and tilt head, Pozi-Loc tripod and Pro-6^{HDV} mid-level spreader. Reference is made in the procedures to figures in [Section 6 - Illustrated Parts List](#). Maintenance must be performed only by competent personnel in accordance with the procedures laid down in this Maintenance Manual.

2 The head and tripod are constructed from precision components, many of which are of aluminium alloy. Several of the assembly procedures require the use of specific sealants, adhesives or lubricants. It is advised that only experienced and properly equipped personnel with access to all necessary materials and tools should attempt to overhaul, repair or replace components on these heads and tripods. The consumable materials required for work on heads and tripods are listed in [Section 3 - Tools and Materials](#).

Pro-6^{HDV} pan and tilt head

Disassembly

Platform

3 Remove the platform as follows ([Fig 6.2](#)):

3.1 If fitted, remove the camera mounting screws ([1.1](#)) and ([1.2](#)) from their stowage in the platform ([2.3](#)).

3.2 Remove four screws ([2.1](#)), ([2.2](#)) securing platform ([2.3](#)) to left-hand and right-hand side covers. Remove platform ([2.3](#)) from head.

4 To dismantle the platform ([Fig 6.2](#)):

4.1 Unscrew and remove the slide plate clamp knob ([3.1](#)) and push in the release button ([3.6](#)). Lift the slide plate assembly ([1](#)) clear of the platform ([2.3](#)).

4.2 Remove the three screws ([3.8](#)) and remove the cover plate ([3.7](#)), side lock spring ([3.4](#)), clamp spring ([3.3](#)), side load clamp ([3.2](#)), slide lock ([3.5](#)) and slide release button ([3.6](#)) from the underside of the platform ([2.3](#)).

Right-hand side plate and balance mechanism

5 Remove the right-hand side plate and balance mechanism as follows ([Fig 6.3](#)):

5.1 Remove the right-hand side plate ([1.9](#)) from the head.

5.2 Slide the balance mechanism assembly ([2](#)) components—spring separator washers ([2.1](#)), balance springs ([2.2](#)), spring cup washers ([2.4](#)), spring cups ([2.3](#)), ([2.5](#)) and sleeve strip ([2.6](#))—off of the spigot in the centre housing ([3.3](#)).

6 To dismantle the balance selector assembly ([Fig 6.3](#)):

6.1 Carefully prise out the balance knob bung ([1.2](#)), and remove the screw ([1.3](#)) and balance knob ([1.4](#)).

6.2 Remove the two dowel pins ([1.5](#)) captivating the two balance selector pins ([1.12](#)).

6.3 Remove the balance selector cam ([1.6](#)) and retain the detent spring ([1.8](#)) and steel ball ([1.7](#)).

- 6.4 Remove the two balance selector pins (1.12) and retain the two springs (1.10).

Centre cover

- 7 Remove the centre cover as follows (Fig 6.2):
- 7.1 Carefully prise off the self-adhesive pan drag knob label (4.1).
 - 7.2 Remove the nut (4.2) and pull the pan drag knob (4.5), washer (4.4) and bearing (4.3) off the pan drag adjustment assembly (6).
 - 7.3 Disengage the lugs on the centre cover (5) from the centre housing (8.2) and pull off the centre cover.

Pan brake

- 8 Remove components of the pan brake as follows (Fig 6.4):
- 8.1 Turn the pan brake knob (2.3) fully counterclockwise.
 - 8.2 Remove the screw (2.2) and pull off the pan brake knob.
 - 8.3 Unscrew and remove the pan brake knob insert (2.4). Remove shim (2.5).
 - 8.4 Pull the coach bolt (2.8), clamp plate (2.7) and release spring (2.6) out of the centre housing (1.2).

Pan drag mechanism

- 9 Remove the pan drag mechanism as follows (Fig 6.4):
- 9.1 Referring to Fig 6.2, screw the threaded sleeve (6.1) out of the pan drag adjuster bridge (6.2).
 - 9.2 Referring to Fig 6.4, remove two screws (4.1) securing the pan drag adjuster bridge to the adjustable drag disc (4.2).
 - 9.3 Referring to Fig 6.2, pull off the pan drag adjuster bridge (6.2) and the pan drag adjuster clip (6.3). Note orientation of clip.
 - 9.4 Referring to Fig 6.2, remove the nut (7.1), the bearing (7.2) and the washer (7.3) from the shaft of the pan base (Fig 6.4, item 5.2).
 - 9.5 Referring to Fig 6.4, pull the pan base (5.2) and associated components—pan bearing (3) and pan drag module (4)—out of the centre housing (1.2). Ensure two springs (4.4) and two drag adjustment shoes (4.5) are retained.

NOTE: The adjustable drag disc (4.2) contains 4.5 grams of Optalus A0 140 drag fluid (part no. R116,23). If required, separate the components of the adjustable drag disc and clean.

- 9.6 Remove the pan bearing sleeve (1.6). Examine the sleeve for wear and replace if necessary.

Left-hand side cover, tilt drag and tilt brake mechanisms

- 10 Remove the left-hand side cover as follows (Fig 6.5):

- 10.1 Remove two screws (3.1) securing the tilt drag adjuster arm (1) to the adjustable drag disc (3.5).
- 10.2 Carefully prise off the tilt drag knob boot (6.3).
- 10.3 Remove the tilt drag grub screw (6.1) and unscrew the tilt drag knob (6.2) and retain the washer (4.5).

NOTE: The M6 threaded end of the tilt drag shaft (2.6)—pre-assembled to the centre housing (2.4)—may be spoiled by the grub screw (6.1). Either replace the tilt drag shaft with a new one or use an M6 die-nut to clean the thread form to aid reassembly.

- 10.4 Remove the tilt brake grub screw (5.6) and remove the tilt brake lever (5.5).
- 10.5 Using a (UNI 5752) M 16 pin spanner, unscrew the (UNI/ISO 2982, 2983) lock ring (5.3).
- 10.6 Unscrew the left-hand threaded tilt brake nut (5.2) and remove the bearing (5.1).
- 10.7 Remove the left-hand side cover (4.3) and tilt drag assembly (3.6), (3.5) from the tilt brake shaft (2.5). Ensure two springs (3.3) and two drag adjustment shoes (3.2) are retained.

NOTE: The adjustable drag disc (3.5) contains 4.5 grams of Optalus A0 140 drag fluid (part no. R116,23). If required, separate the components of the adjustable drag disc and clean.

- 10.8 Remove the wave washer (4.1) from the tilt brake shaft (2.5).
- 10.9 Remove the friction ring (4.2) from the centre housing (2.4).
- 10.10 Unscrew the tilt drag shaft (2.6) and remove the tilt drag adjuster arm (1).
- 10.11 Using an M7 allen key, unscrew the tilt brake shaft (2.5) from the centre housing (2.4) and remove the tilt drag shaft (2.6).
- 10.12 If required, remove the tilt bearing sleeve (2.8). Examine the sleeve for wear and replace if necessary.

Illumination module

- 11 Remove and disassemble the illumination module as follows (Fig 6.2):
 - 11.1 Remove illumination module (9) by pressing the retaining tabs together from the underside of the centre housing (8.2) and lifting out from above.
 - 11.2 Push the battery (9.4) out of the illumination module from behind using a suitable pointer (pen).
 - 11.3 Flex the plastic retaining tabs and remove the illumination PCB (9.3) from the support plate (9.2).
 - 11.4 Carefully peel the self adhesive label (9.1) from the support plate (9.2).
- 12 Remove the level bubble as follows:
 - 12.1 Remove the spring clip (8.5) and lift the level bubble (8.6) out of the centre housing (8.2).



Assembly

Lubrication

13 During assembly, lubricate components as follows:

13.1 Shell Darina R2 (yellow) grease

13.1.1 The small threaded part of the shaft of the pan base assembly ([Fig 6.4 Item 5.2](#)).

13.1.2 The balance selection pins ([Fig 6.3 Item 1.12](#))

13.2 AGIP PV (NLGI 2) (white) grease

13.2.1 The pan bearing ([Fig 6.4 Item 3](#)).

13.2.2 Pan bearing sleeve ([Fig 6.4 Item 5.1](#)).

13.2.3 Tilt bearing sleeve ([Fig 6.3 Item 1.11](#)).

13.2.4 Tilt brake sleeve ([Fig 6.5 Item 4.4](#)).

13.3 Kluberlub BE41-501 (black) grease

13.3.1 The cylindrical pivot lugs of the side load clamp ([Fig 6.2 Item 3.2](#)).

13.3.2 The side load slide lock ([Fig 6.2 Item 3.5](#)).

13.3.3 The clamp knob ([Fig 6.2 Item 3.1](#)).

13.3.4 The side load clamp spring ([Fig 6.2 Item 3.3](#)).

13.3.5 The side lock spring ([Fig 6.2 Item 3.4](#)).

13.3.6 The pan drag adjustment sleeve ([Fig 6.2 Item 6.1](#)).

13.3.7 The pan drag bridge ([Fig 6.2 Item 6.2](#)).

13.3.8 The tilt drag adjustment arm ([Fig 6.5 Item 1](#)).

13.3.9 The tilt brake insert ([Fig 6.5 Item 5.2](#)).

13.3.10 The lock ring ([Fig 6.5 Item 5.3](#)).

13.4 Arexon TT163 lubricant

13.4.1 Balance selector pin springs ([Fig 6.3 Items 1.10](#)).

13.4.2 Balance springs ([Fig 6.3 Items 2.2](#)).

Illumination module

14 Install the illumination module as follows ([Fig 6.2](#)):

14.1 Install the level bubble ([8.6](#)) into the centre housing ([8.2](#)) and secure with the spring clip ([8.5](#)).

14.2 If required, carefully apply a new self adhesive label ([9.1](#)) to the top of the support plate ([9.2](#)).

14.3 Install the illumination PCB (9.3) into the support plate (9.2) ensuring that the plastic retaining tabs secure the PCB.

14.4 Install the battery (9.4) into the holder on the PCB, ensuring the correct polarity (Fig 6.2).

14.5 Install the complete illumination module (9) into the centre housing (8.2), pushing down so that it “snaps” into place.

Left-hand side cover, tilt drag and tilt brake mechanisms

15 Install the left-hand side cover, tilt drag and tilt brake mechanism as follows (Fig 6.5):

15.1 Place the tilt drag shaft (2.6) inside the tilt brake shaft (2.5). Using an M7 allen key, secure the tilt brake shaft (2.5) into the centre housing (2.4).

15.2 If necessary, lubricate the tilt drag adjuster arm (1) with Kluberlub BE41-501 grease and screw the tilt drag shaft (2.6) into the tilt drag adjuster arm (1) so the end of the shaft (2.6) is flush with the adjuster arm (1).

15.3 Install the wave washer (4.1) onto the tilt brake shaft (2.5), and the friction ring (4.2) into the centre housing (2.4).

15.4 Install two springs (3.3) and two drag adjustment shoes (3.2) in the slots in the centre housing (2.4).

15.5 If necessary, lubricate the tilt brake sleeve (4.4) with AGIP PV grease and install into the left-hand side cover (4.3).

15.6 If necessary, separate the adjustable drag disc (3.5) from the fixed drag disc (3.6), clean the components and apply 4.5 grams of Optalus A0 140 drag fluid (part no. R116,23). Reassemble the two halves of the drag module (3).

15.7 Install the drag module (3) into the left-hand side cover (4.3) ensuring that the spigots on the fixed drag disc (3.6) engage with the mating features on the inside of the left-hand side cover (4.3).

15.8 Install the left-hand side cover(4.3) / drag module (3) assembly over the tilt brake shaft (2.5), with the legs of the adjustable drag disc (3.5) through the slots in the centre housing (2.4) and aligned to the two drag adjustment shoes (3.2).

15.9 Place two washers (3.4) between the legs of the adjustable drag disc (3.5) and the drag adjustment arm (1). Install two screws (3.1) and secure the drag adjuster arm (1) to the adjustable drag disc (3.5).

15.10 If necessary, lubricate the tilt brake nut (5.2) with Kluberlub BE41-501 grease, install the bearing (5.1) and screw the left-handed tilt brake nut (5.2) onto the tilt brake shaft (2.5).

15.11 If necessary, lubricate the lock ring (5.3) with Kluberlub BE41-501 grease and using a (UNI 5752) M 16 pin spanner, screw the (UNI/ISO 2982, 2983) lock ring (5.3) fully onto the tilt brake shaft (2.5).

15.12 Turn the tilt brake nut (5.2) counterclockwise until the tilt brake is fully applied.

15.13 Install the tilt brake lever (5.5) on to the nut (5.2) with the lever approximately 30° - 45° past vertical, pointing downward toward the rear of the head, or as suitable to the operator.

15.14 Turn the tilt brake lever (5.5) fully clockwise and ensure that the brake is released. Turn the lever (5.5) counterclockwise and ensure the brake is applied at a suitable position before the lever (5.5) interferes with other head controls.

15.15 Readjust as necessary and secure the tilt brake lever (5.5) with the tilt brake grub screw (5.6).

15.16 Install the washer (4.5) and screw the drag knob (6.2) onto the tilt drag shaft (2.6) and secure in position with the tilt drag grub screw (6.1).

15.17 Install the tilt drag knob boot (6.3) over the tilt drag knob (6.2).

Pan drag mechanism

16 Install the pan drag mechanism as follows (Fig 6.4):

16.1 If necessary, lubricate the pan bearing sleeve (1.6) with AGIP PV grease and install into the centre housing (1.2).

16.2 If necessary, separate the adjustable drag disc (4.2) from the fixed drag disc (4.3), clean the components and apply 4.5 grams of Optalus A0 140 drag fluid (part no. R116,23). Reassemble the two halves of the drag module (4).

16.3 Install the drag module (4) into the pan base (5.2) ensuring that the spigots on the fixed drag disc (4.3) engage with the mating features on the inside of the pan base (5.2).

16.4 If necessary, lubricate the pan bearing (3) with Kluberlub BE41-501 grease and install onto the pan base (5.2).

16.5 Install the pan base (5.2) / pan bearing (3) / drag module (4) assembly into the underside of the centre housing (1.2), with the legs of adjustable drag disc (4.2) through the slots in the centre housing (1.2) and aligned to the two drag adjustment shoes (4.5).

16.6 Referring to (Fig 6.2), install the washer (7.3), bearing (7.2) and nut (7.1) onto the protruding thread from the pan base (Fig 6.4 item 5.2) and carefully tighten the nut (7.1) so that the pan bearing runs freely without being too loose.

16.7 Referring to (Fig 6.2), install the pan drag adjustment clip (6.3)—with the vertical edge uppermost—onto the pan base thread (Fig 6.4 item 5.2).

16.8 Referring to (Fig 6.2), lubricate the pan drag adjustment bridge (6.2) with Kluberlub BE41-501 grease and screw the left-hand threaded pan adjustment sleeve (6.1) into the pan drag adjustment bridge (6.2). Install this assembly (6.2, 6.1) onto the protruding pan base thread (Fig 6.4 item 5.2), ensuring the vertical edge of the adjustment clip (6.3) locates on the flat portion of the adjustment bridge (6.2).

NOTE: If the pan drag adjustment clip (6.3) is placed incorrectly (vertical edge downward) the drag setting will adjust as the pan axis rotates.

16.9 Install two screws (Fig 6.4 item 4.1) and secure the pan drag adjustment bridge (6.2) to the adjustable drag disc (Fig 6.4 item 4.2).

Pan brake

17 Install the pan brake as follows (Fig 6.4):

- 17.1 Position the clamp plate (2.7) and the release spring (2.6) on the coach bolt (2.8) and install in the centre housing (1.2) ensuring the clamp plate (2.7) locates in the groove running around the pan base assembly (5.2).
- 17.2 Install the shim (2.5) on the coach bolt (2.8) and fasten the pan brake knob insert (2.4) down finger tight until the pan brake is fully applied.
- 17.3 Install the pan brake knob (2.3) on the pan brake knob insert (2.4), approximately at right angles to the body of the head.
- 17.4 Turn the knob (2.3) fully counterclockwise and ensure the brake is released. Turn the knob (2.3) clockwise and ensure the brake is applied before the knob reaches the end of its travel.
- 17.5 Readjust as necessary and secure the knob with the screw (2.2).

Centre cover

- 18 To install the centre cover (Fig 6.2):
 - 18.1 Position the centre cover (5) on the centre housing (8.2), with the Vinten Protouch logo facing forwards and push down to engage the lugs.
 - 18.2 Install the pan drag knob (4.5), washer (4.4) and bearing (4.3) onto the protruding pan base thread (Fig 6.4 item 5.2) and secure with nut (4.2).
 - 18.3 Apply the self-adhesive pan drag knob label (4.1) to the pan drag knob (4.5).

Right-hand side plate and balance mechanism

- 19 Assemble the balance mechanism as follows (Fig 6.3):
 - 19.1 If required, lubricate the three balance springs (2.2) with Arexon TT163 lubricant.
 - 19.2 Install the sleeve strip (2.6) into centre spigot in the centre housing (3.3), succeeded by the following components in the following order:
 - 19.2.1 Spring cup washer (2.4), large spring cup (2.5), balance spring (2.2), spring separator washer (2.1), balance spring (2.2), spring cup washer (2.4), small spring cup (2.3), balance spring (2.2) and spring separator washer (2.1).
- 20 Assemble the right-hand side plate assembly as follows:
 - 20.1 If required, lubricate the two balance selector pin springs (1.10) with Arexon TT163 lubricant, and both balance selector pins (1.12) with Shell Darina R2 grease. Install a spring (1.10) onto each balance selector pin (1.12).
 - 20.2 Install both selector pin (1.12) / spring (1.10) assemblies into the right-hand side plate (1.9).
 - 20.3 Install the detent spring (1.8) and steel ball (1.7) into the right-hand side plate (1.9).
 - 20.4 Install the balance selector cam (1.6) over the spigot on the right-hand side plate (1.9) ensuring that the detent feature on the underside aligns with the steel ball (1.7),
 - 20.5 Depress the balance selector pins (1.12) and install the two dowel pins (1.5) through the balance selector cam (1.6) into the holes in balance selector pins (1.12) to captivate them.

- 20.6 Install the balance knob (1.4), secure with screw (1.3) and fit balance knob bung (1.2).
- 20.7 If necessary lubricate the tilt bearing sleeve (1.11) with AGIP PV grease and install into the right-hand side plate (1.9).
- 20.8 Install the right-hand side plate (1.9) over the balance mechanism, aligning the tilt bearing sleeve (1.11) to the spigot on the centre housing (3.3).

Platform

- 21 To assemble the platform (Fig 6.2):
 - 21.1 If required, use Kluberlub BE41-501 grease to lubricate the pivot lugs on the side load clamp (3.2), slide lock (3.5) and side lock spring (3.4).
 - 21.2 Install the side load clamp (3.2), slide lock (3.5), side lock spring (3.4) and release button (3.6) into the underside of the platform (2.3).
 - 21.3 If required, lubricate the clamp spring (3.3) with Kluberlub BE41-501 grease and carefully position in the underside of the side load clamp (3.2).
 - 21.4 Carefully align the recess in the underside of the cover plate (3.7) with the clamp return spring (3.3) and secure the cover plate (3.7) in place using three screws (3.8).
 - 21.5 If required, lubricate the clamp knob (3.1) with Kluberlub BE41-501 grease and install into the platform (2.3).
- 22 To install the platform (Fig 6.2):
 - 22.1 Position the assembled platform on the left-hand and right-hand side covers and secure with four screws (2.1) (2.2).

Pozi-loc tripod

General

- 23 The tripod legs are constructed using adhesive processes. The following procedures are the limit of component replacement.

Replacing tripod legs

- 24 The legs are secured in the bowl assembly by pivot clamps. Each clamp is secured by a single screw.

Removal

- 25 Remove the tripod leg as follows (Fig 6.7):
 - 25.1 If necessary, remove the hook (6), which passes through one of the leg pivot clamps (2) and screws into the bowl assembly (1).
 - 25.2 Remove the screws (4) and leg pivot washers (3) securing the leg pivot clamps (2) to the bowl assembly (1).
 - 25.3 Pull off the tripod leg. Note orientation and remove two leg pivot friction rings (7) and two leg pivot washers (8).

Installation

26 Install the tripod leg as follows (Fig 6.7):

26.1 Install two leg pivot friction rings (7) and two leg pivot washers (8) on the tripod leg, oriented as noted in removal

NOTE: Do not apply any lubricant to the bowl, the leg trunnions, leg pivot friction rings or washers.

26.2 Position the leg in the bowl assembly (1), ensuring that the leg pivot friction rings (7) are correctly seated.

26.3 Install the leg pivot clamps (2) and secure with screws (4) and leg pivot washers (3), using Loctite 221. Tighten screws to a torque of 4.5 Nm (40 lbf in.).

26.4 If required, install the hook (6), using Loctite 221.

Replacing the components of the top clamp assembly

Dismantling

27 Dismantle the top clamp as follows (Fig 6.7):

27.1 Turn the clamp (28) counterclockwise to the 'OFF' position.

27.2 Remove screw (14). Using a suitable peg spanner, unscrew and remove the threaded insert (13).

27.3 Remove the clamp assembly (12) from the top clamp moulding.

27.4 Remove the clamp knob (28) and the clamp insert (27). Pull the clamp insert off the shaft of the clamp knob.

Assembly

28 Assemble the top clamp as follows (Fig 6.7):

28.1 Apply Chesterton 622 grease to the cam surface of the clamp insert (27) and the thread of the clamp knob (28).

28.2 Install the clamp insert (27) on the clamp knob (28) and position in the top clamp moulding. Turn the clamp knob (28) to the vertical, 'off' position

28.3 Install the clamp assembly (12) in the top clamp moulding.

28.4 Screw the threaded insert (13) onto the shaft of the clamp knob (28).

28.5 While sliding the leg in and out, gradually tighten the threaded insert (13) until the clamp begins to grip.

28.6 If not aligned, back off the threaded insert (13) until a slot aligns with the hole for screw (14).

28.7 Back off the threaded insert (13) a further **three** slots and install screw (14) to secure the threaded insert.



Replacing the components of the bottom clamp assembly

29 To dismantle the bottom clamp it is necessary to remove the oval leg.

NOTE: The design of the bottom clamp has been modified
At Serial No. 03515, the shaft was fitted with a locking thread insert and the 2 x M5 grubscrews, were changed to 1 x M5 x 10 mm

Dismantling - current clamps

30 Remove the clamp knob as follows (Fig 6.7):

30.1 Turn the clamp knob (23) counterclockwise to the 'OFF' position.

30.2 Using a suitable instrument, such as a flat-bladed screwdriver, carefully remove the knob cap (26).

30.3 Remove the screw (25), washer (24) and clamp knob (23).

30.4 Remove the grubscrew (16).

31 Remove the oval leg as follows (Fig 6.7):

31.1 Remove the screw (21) securing the foot (22) to the oval leg tube (15).

31.2 Slide the leg upwards until the T-piece is at about the midway position.

31.3 Flex the leg tubes outwards and disengage the T-piece towards the rear. Pull the oval leg backwards and upwards out of the bottom clamp.

32 Remove the bottom clamp as follows (Fig 6.7):

32.1 Remove the lower clamp assembly (20), the cam moulding (19), the bottom clamp shaft (18) and the washer (17) from the bottom clamp moulding.

Assembly - current clamps

33 Install the bottom clamp as follows (Fig 6.7):

33.1 Apply Chesterton 622 grease to the cam surface of the cam moulding (19) and the washer (17).

33.2 Install the washer (17), the bottom clamp shaft (18), the cam moulding (19) and the lower clamp assembly (20) in the bottom clamp moulding.

34 Install the oval leg as follows (Fig 6.7):

34.1 Working from the rear, insert the oval leg (15) in the bottom clamp moulding, taking care not to damage the surface of the lower clamp assembly (20).

34.2 Push the leg down until the T-piece is at about the midway position. Flex the leg tubes outwards and engage the T-piece with the legs.

34.3 Refit the foot (22) on the oval leg tube (15) and secure with the screw (21).

35 Install the clamp knob as follows (Fig 6.7)

35.1 Position the clamp knob (23) on the bottom clamp shaft (18) and turn the knob counterclockwise to the 'OFF' position

35.2 Install the grubscrew (16) in the bottom clamp shaft (18).

36 Adjust the clamp (See '[Pozi-Loc](#)' tripod leg clamp adjustment on page 28).

Dismantling - earlier clamps

37 Remove the clamp knob as follows (Fig 6.7):

37.1 Turn the clamp knob (23) counterclockwise to the 'OFF' position.

37.2 Using a suitable instrument, such as a flat-bladed screwdriver, carefully remove the knob cap (26).

37.3 Remove the screw (25), washer (24) and clamp knob (23).

37.4 Remove the locking and adjusting grubscrews (30).

38 Remove the oval leg as follows (Fig 6.7):

38.1 Remove the screw (21) securing the foot (22) to the oval leg tube (15).

38.2 Slide the leg upwards until the T-piece is at about the midway position.

38.3 Flex the leg tubes outwards and disengage the T-piece towards the rear. Pull the oval leg backwards and upwards out of the bottom clamp.

39 Remove the bottom clamp as follows (Fig 6.7):

39.1 Remove the lower clamp assembly (20), the cam moulding (19), the bottom clamp shaft (29) and the washer (17) from the bottom clamp moulding.

Assembly - earlier clamps

40 Install the bottom clamp as follows (Fig 6.7):

40.1 Apply Chesterton 622 grease to the cam surface of the cam moulding (19) and the washer (17).

40.2 Install the washer (17), the bottom clamp shaft (29), the cam moulding (19) and the lower clamp assembly (20) in the bottom clamp moulding.

41 Install the oval leg as follows (Fig 6.7):

41.1 Working from the rear, insert the oval leg (15) in the bottom clamp moulding, taking care not to damage the surface of the lower clamp assembly (20).

41.2 Push the leg down until the T-piece is at about the midway position. Flex the leg tubes outwards and engage the T-piece with the legs.

41.3 Refit the foot (22) on the oval leg tube (15) and secure with the screw (21).

42 Install the clamp knob as follows (Fig 6.7)

42.1 Position the clamp knob (23) on the bottom clamp shaft (29) and turn the knob counterclockwise to the 'OFF' position

42.2 Install a grubscrew (30) in the bottom clamp shaft (29).

42.3 Adjust the clamp (See 'Pozi-Loc' tripod leg clamp adjustment on page 28).

Pro-6^{HDV} mid-level spreader

Disassembly

Selector housing

43 Dismantle the selector housing as follows (Fig 6.9):

43.1 Remove the key ring (1) from the pivot housing (8) and carefully peel the label (2) from the retaining disc (4).

NOTE: Observe the label (2) can only be orientated in one position—with the centre cut out aligned to the upstand on the pivot housing (8).

43.2 Remove three screws (3) and retaining disc (4).

NOTE: Observe the retaining disc (4) can only be orientated in one position—with the centre cut out aligned to the upstand on the pivot housing (8).

43.3 Remove the detent spring (5), steel ball (6) and selector cap (7).

Leg assembly

44 Remove and dismantle the leg assembly as follows (Fig 6.9):

44.1 Press out the pivot pin (9) from the pivot housing (8), disengaging the straight knurled end first, and remove the leg assembly.

CAUTION! Do NOT attempt to remove the extension clamps Fig 1.3, item (29) from the leg sub assembly (10). The thread will be damaged. If extension clamps Fig 1.3, item (29) are damaged a replacement leg sub assembly (10) must be fitted.

44.2 Remove screw (14) and separate the left-hand (13) and right-hand (20) tripod interface mouldings.

44.3 Remove spring (19) and two release levers (16).

44.4 Remove pivot shaft (18).

44.5 Remove two screws (17), nuts (11) and pivot blocks (12).

Assembly

Leg assembly

45 Assemble and refit the leg assembly as follows (Fig 6.9):

45.1 Refit the two pivot blocks (12) on the swivel feature on the end of the leg sub assembly (10), and secure using two screws (17) and two nuts (11).

45.2 Refit the pivot shaft (18) into the pivot blocks (12).

45.3 Refit a release lever (16) into both the left-hand (13) and right-hand (20) tripod interface mouldings.

45.4 Install the spring (19) into the recess in one of the release levers (16).

45.5 Fit both left-hand (13) and right-hand (20) tripod interface mouldings together over the pivot blocks (12), captivating the pivot shaft (18) and ensuring the spring (19) locates in both release lever (16) recesses.

NOTE: Replace the right-hand tripod interface moulding (20). It may have been damaged by the self tapping screw (14) when originally assembled.

45.6 Secure left-hand (13) and right-hand (20) tripod interface mouldings together with screw (14).

NOTE: Replace the pivot housing (8). It may have been damaged by the knurled pivot pin (9) when originally assembled.

45.7 Install the leg sub assembly (10) into the pivot housing (8) and secure with a pivot pin (9), pressing the plain diameter in first.

Selector housing

46 Assemble the selector housing as follows (Fig 6.9):

NOTE: Replace the pivot housing (8). It may have been damaged by the self tapping screws (3).

46.1 Refit the selector cap (7) ensuring the internal detent cut-out aligns with the slot in the pivot housing (8).

46.2 Refit the steel ball (6) and detent spring (5) into the slot in the pivot housing (8).

46.3 Install the retaining disc (4), aligning the centre cut out with the upstand on the pivot housing (8).

46.4 Secure the retaining disc (4) to the pivot housing (8) using three screws (3).

46.5 Apply the label (2) to the retaining disc (4), aligning the centre cut out with the upstand on the pivot housing (8).

46.6 Install the key ring (1) into the centre of the pivot housing (8).



Section 6

Illustrated Parts List

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Introduction

1 This parts list is issued for the Protouch Pro-6^{HDV} system, manufactured for Camera Dynamics Limited, Western Way, Bury St. Edmunds, Suffolk, IP33 3TB, England.

2 The system comprises a Pro-6^{HDV} pan and tilt head, a Pozi-Loc two-stage tripod, either an adjustable floor spreader or mid-level spreader and soft case ([see page 46](#)).

Ordering spare parts

3 Always quote the head or tripod serial number.

4 Spare parts for the Pro-6^{HDV} pan and tilt head are supplied as sub-assemblies. Individual components are not available.

5 When ordering a spare part, please quote the part number, NOT the item number.

6 Due to restrictions placed on the transportation of adhesives and other materials, please obtain supplies of consumable materials from your local distributor.



Main assembly part numbers

7 Ensure that the correct serial and part numbers are quoted when ordering main assemblies.

Assembly	Part No.
Pro-6 ^{HDV} pan and tilt head, comprising:	V4018-0001
Pro-6 ^{HDV} pan and tilt head - main unit assembly	V4018-1000
Pan bar assembly	PRO6LV
Bowl clamp assembly	R503,728
Camera slide plate	PRO6PLV
Battery - 3V Lithium button cell	CR1220
Tripod	3819-3
Floor spreader (supplied with Pro-6 HDVF system)	3818-3
Mid-level spreader (supplied with Pro-6 HDVM system)	V4032-0001
Case	U005-190

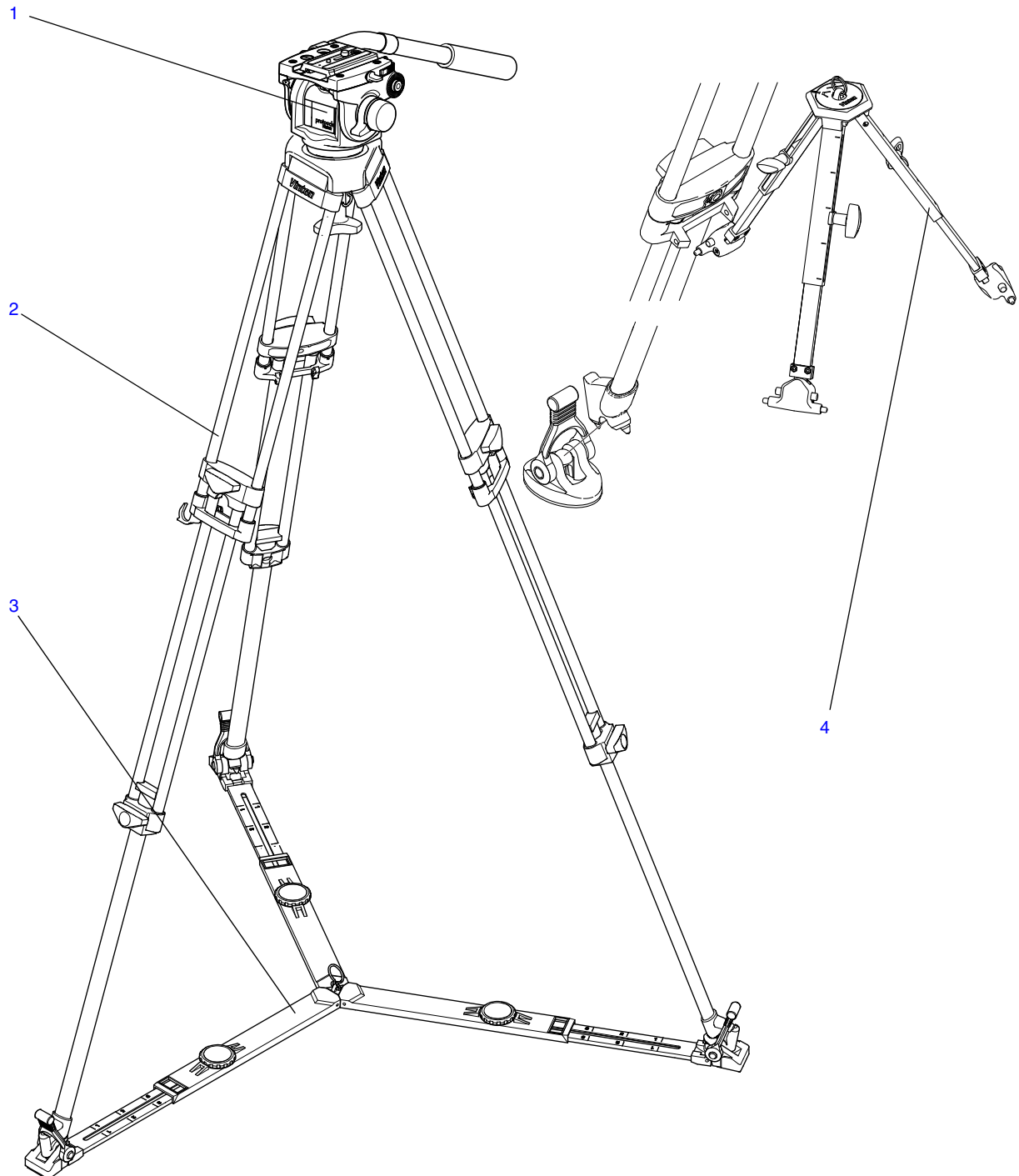


Fig 6.1 Pro-6^{HDV} Systems

Fig 6.1 Pro-6^{HDV} Systems

Item No.	Part No.	Nomenclature	Qty
1	V4018-0001	Pro-6 ^{HDV} pan and tilt head (Fig 6.2) (Fig 6.3) (Fig 6.4) (Fig 6.5)	1
2	3819-3	Pozi-Loc two-stage tripod (Fig 6.6)	1
3	3818-3	Floor spreader (Fig 6.8), supplied with Pro-6 HDVF system	1
4	V4032-0001	Mid-level spreader (Fig 6.9), supplied with Pro-6 HDVM system	1

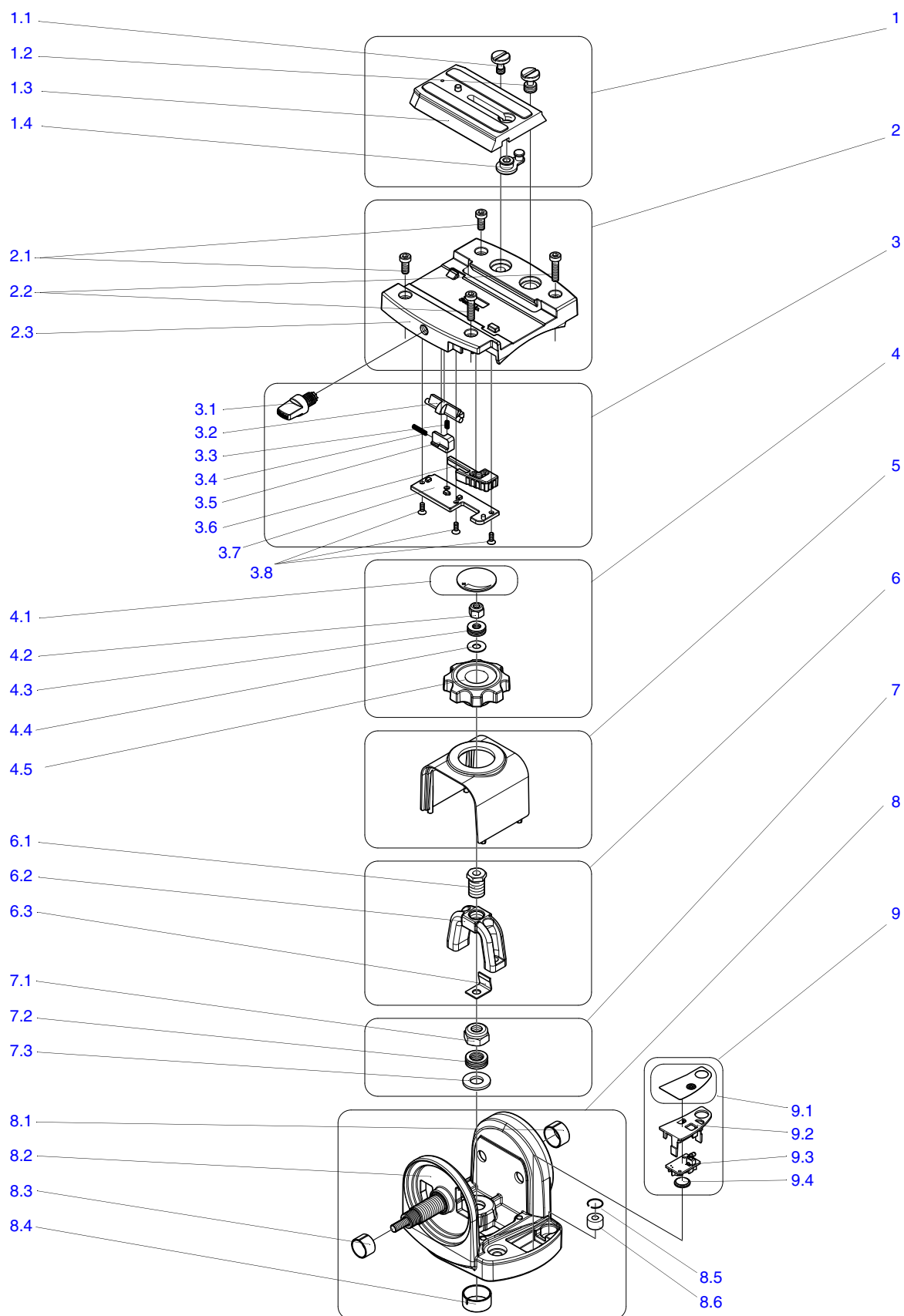


Fig 6.2 Pro-6^{HDV} Pan and Tilt Head - Main Casting and Platform



Fig 6.2 Pro-6^{HDV} Pan and Tilt Head - Main Casting and Platform

Item No.	Part No.	Nomenclature	Qty
1	PRO6PLV	Camera plate for Pro-6 ^{HDV}	1
1.1		Screw, camera mounting, 1/4 in. BSW	1
1.2		Screw, camera mounting, 3/8 in. BSW	1
1.3		Slide plate	1
1.4		Plug, camera screw blanking	1
2	RV4018-2004	Assembly, camera platform	1
2.1		Screw, low-profile, socket, M5 x 12 mm long	2
2.2		Screw, low-profile, socket, M5 x 20 mm long	2
2.3		Platform	1
3	RS2002-2003	Assembly, camera slide clamp	1
3.1		Clamp knob	1
3.2		Side load clamp	1
3.3		Spring, side load clamp	1
3.4		Spring, side lock	1
3.5		Slide lock, side load	1
3.6		Release button, side load	1
3.7		Cover, side load	1
3.8		Screw, countersunk, pozidrive, M3 x 8 mm long	3
4	RV4018-2013	Assembly, pan drag knob	1
4.1	R503,222	Label, pan drag knob	1
4.2		Nut, M6, nyloc, full	1
4.3		Bearing, ball, thrust	1
4.4		Washer, M6, plain, large	1
4.5		Knob, pan drag	1
5	RV4018-2009	Centre cover moulding	1
6	R501,59	Assembly, pan drag adjustment	1
6.1		Threaded sleeve, pan drag adjustment	1
6.2		Bridge, pan drag adjustment	1
6.3		Clip, pan drag adjustment	1



Fig 6.2 Pro-6^{HDV} Pan and Tilt Head - Main Casting and Platform (Cont)

Item No.	Part No.	Nomenclature	Qty
7	R503,90	Assembly, small pan bearing	1
7.1	Nut, M10, nyloc, thin		1
7.2	Bearing, ball, thrust		1
7.3	Washer, M10, plain, heavy		
8	R503,310	Assembly, centre housing	1
8.1	Sleeve, tilt bearing		1
8.2	Assembly, centre housing mechanism		1
8.3	Sleeve, tilt brake		1
8.4	Sleeve, pan bearing		1
8.5	Spring clip, level bubble		1
8.6	Level bubble		1
9	R503,329	Assembly, illuminated level bubble	1
9.1	RV4018-2019	Label, level bubble plate	1
9.2	Housing, illuminated level bubble		1
9.3	PCB assembly, illuminated level bubble		1
9.4	Battery, 3v Lithium button cell CR1220		1

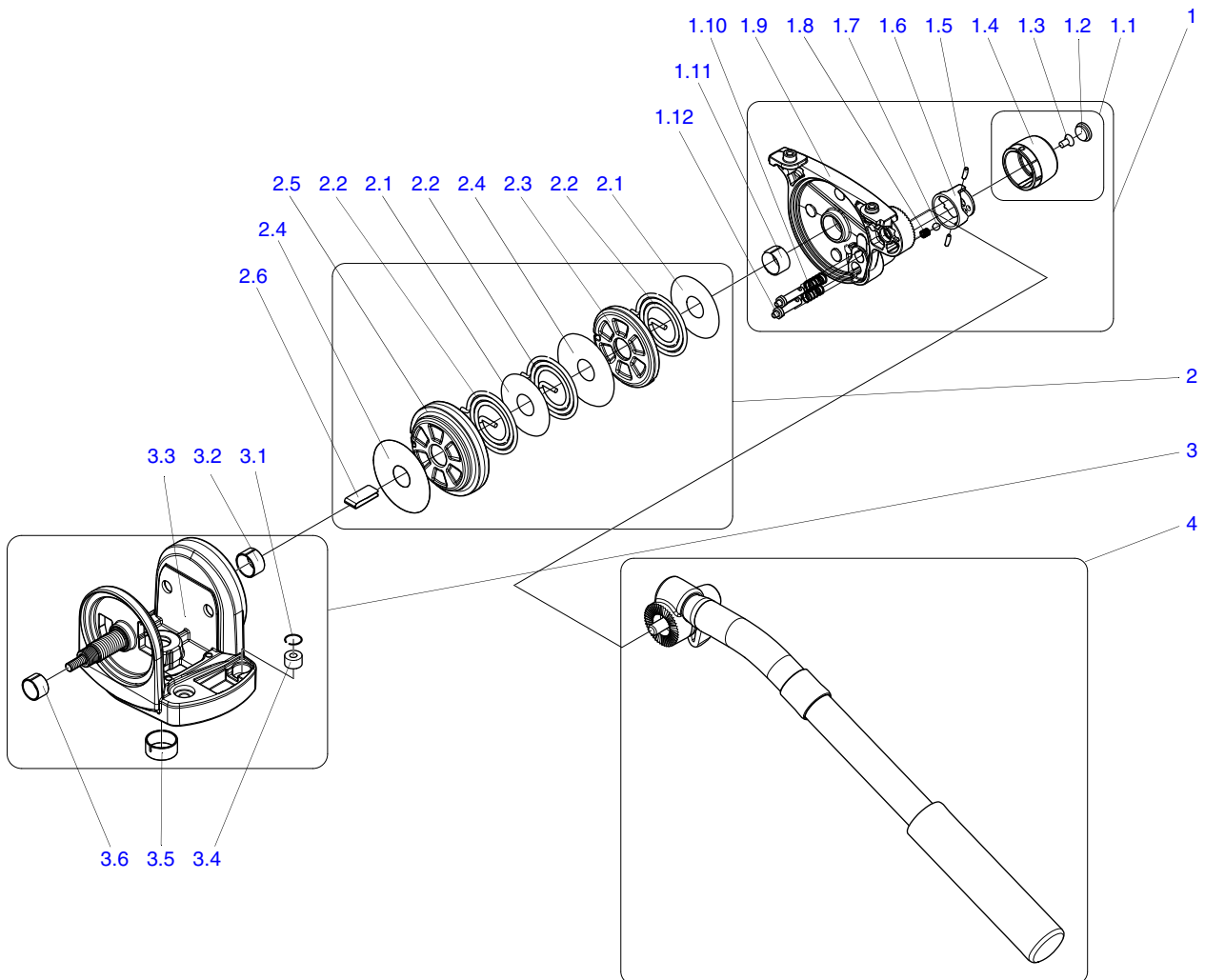


Fig 6.3 Pro-6^{HDV} Pan and Tilt Head - RH Side Plate and Balance Assembly



Fig 6.3 Pro-6^{HDV} Pan and Tilt Head - RH Side Plate and Balance Assembly

Item No.	Part No.	Nomenclature	Qty
1	RV4018-2002	Assembly, right hand side housing	1
1.1	RV4018-2012	Assembly, balance knob	1
1.2		Plug, balance knob	1
1.3		Screw, countersunk, socket, M4 x 8 mm long	1
1.4		Balance knob	1
1.5		Needle roller	2
1.6		Cam, balance selection	1
1.7		Ball, steel, 5mm dia.	1
1.8		Spring, balance selector detent	1
1.9		Right hand side housing	1
1.10		Spring, balance selector pin	2
1.11		Sleeve, tilt bearing	1
1.12		Pin, balance selection	2
2	R503,322	Assembly, balance springs	1
2.1		Shim washer, spring separator	2
2.2		Balance spring	3
2.3		Spring cup, inner	1
2.4		Shim washer, spring cup	2
2.5		Spring cup, outer	1
2.6		Liner strip, torsion spring	1
3	R503,310	Assembly, centre housing	1
3.1		Spring clip, level bubble	1
3.2		Sleeve, tilt bearing	1
3.3		Assembly, centre housing mechanism	1
3.4		Level bubble	1
3.5		Sleeve, pan bearing	1
3.6		Sleeve, tilt brake	1
4	PRO6LV	Assembly, pan bar	1

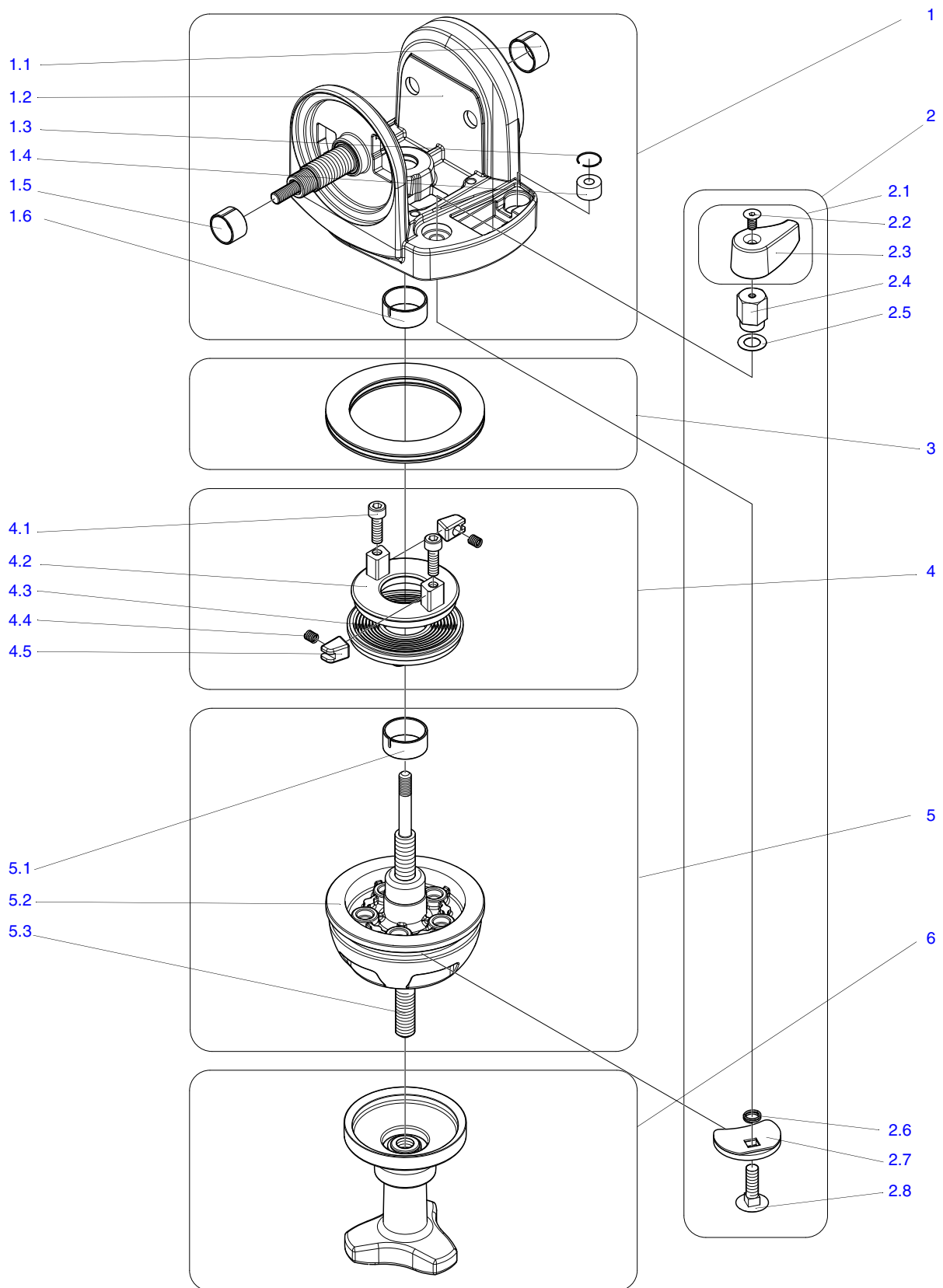


Fig 6.4 Pro-6^{HDV} Pan and Tilt Head - Pan Drag and Ball Base



Fig 6.4 Pro-6^{HDV} Pan and Tilt Head - Pan Drag and Ball Base

Item No.	Part No.	Nomenclature	Qty
1	R503,310	Assembly, centre housing	1
1.1		Sleeve, tilt bearing	1
1.2		Assembly, centre housing mechanism	1
1.3		Spring clip, level bubble	1
1.4		Level bubble	1
1.5		Sleeve, tilt brake	1
1.6		Sleeve, pan bearing	1
2	R503,355	Assembly, pan brake	1
2.1	RV4018-2014	Assembly, pan brake knob	1
2.2		Screw, countersunk head, socket, M 4 x 8 mm long	1
2.3		Knob, pan brake	1
2.4		Insert, pan brake knob	1
2.5		Shim, 8 mm ID x 14 mm OD x 0.30 mm thick	1
2.6		Spring, pan brake release	1
2.7		Clamp plate, pan brake	1
2.8		Bolt, dome head, coach, M 6 x 20 mm long	1
3	R3,2223	Bearing, pan	1
4	R501,56	Assembly, pan drag	1
4.1		Screw, cap head, socket, M 5 x 16 mm long	2
4.2		Drag disc, adjustable	1
4.3		Drag disc, fixed	1
4.4		Spring, drag	2
4.5		Shoe, drag disc adjustment	2
	R116,23	Drag fluid, Optalus A0 140, 4.5 grams	1
5	RV4018-2006	Assembly, pan base spares	1
5.1		Sleeve, pan bearing	1
5.2		Assembly, pan base	1
5.3		Stud	1
6	R503,728	Assembly, Bowl clamp	1

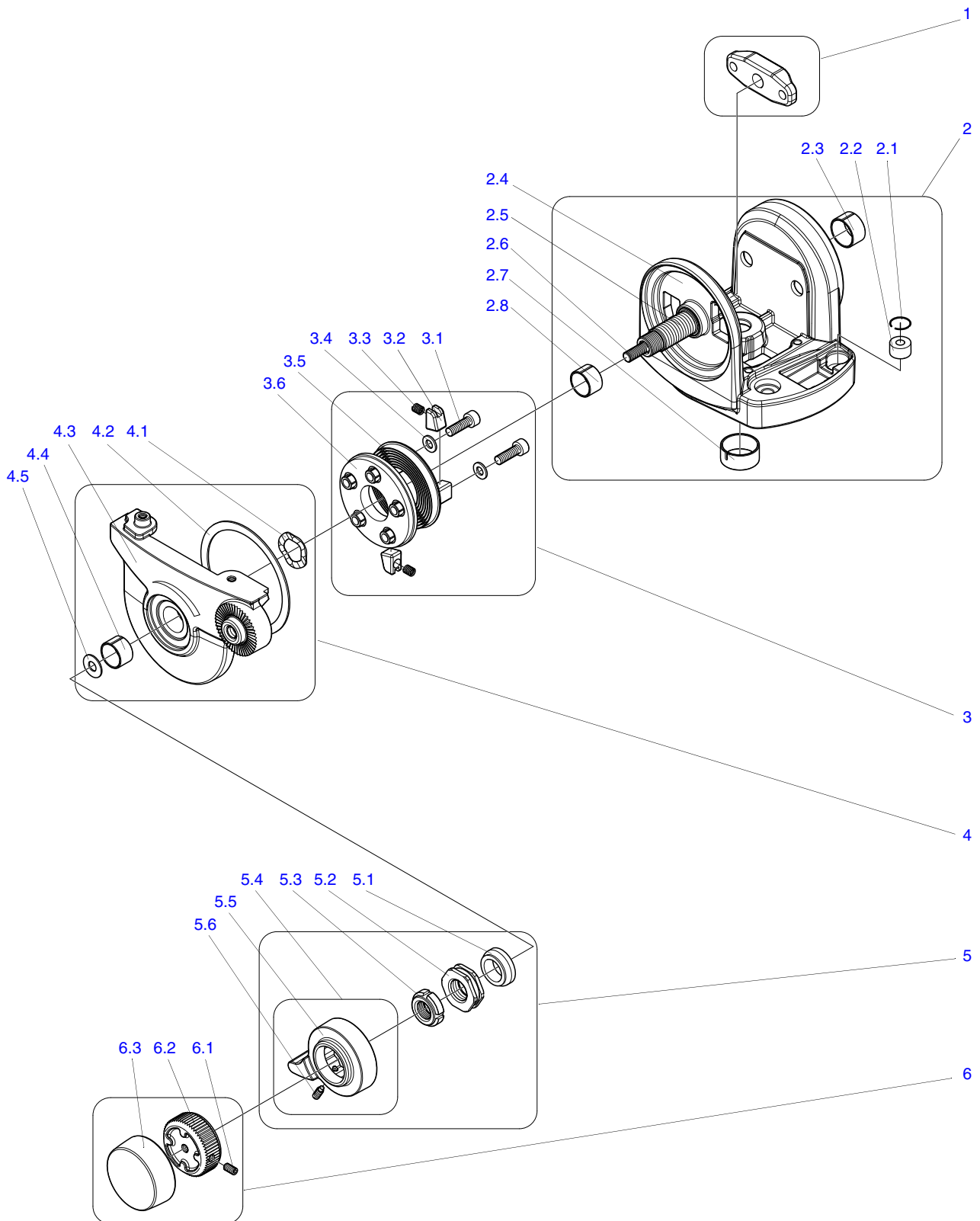


Fig 6.5 Pro-6^{HDV} Pan and Tilt Head - LH Side Plate and Tilt Brake



Fig 6.5 Pro-6^{HDV} Pan and Tilt Head - LH Side Plate and Tilt Brake

Item No.	Part No.	Nomenclature	Qty
1	R501,60	Arm, tilt drag adjustment	1
2	R503,310	Assembly, centre housing	1
2.1		Spring clip, level bubble	1
2.2		Level bubble	1
2.3		Sleeve, tilt bearing	1
		Assembly, centre housing mechanism, consisting of:	1
2.4		Centre housing mechanism	1
2.5		Tilt drag shaft	1
2.6		Tilt brake shaft	1
2.7		Sleeve, pan bearing	1
2.8		Sleeve, tilt brake	1
3	R501,55	Assembly, tilt drag	1
3.1		Screw, cap head, socket, M 5 x 16 mm long	2
3.2		Shoe, drag disc adjustment	2
3.3		Spring, drag	2
3.4		Washer, plain, M5	2
3.5		Drag disc, adjustable	1
3.6		Drag disc, fixed	1
	R116,23	Drag fluid, Optalus A0 140, 4.5 grams	1
4	RV4018-2000	Assembly, LH side housing	1
4.1		Wave washer, 14 mm ID x 21.8 mm OD x 1.6 mm thick	1
4.2		Friction ring, tilt brake	1
4.3		LH side housing	1
4.4		Sleeve, tilt brake	1
4.5		Washer, large, plain, M 6	1
5	R503,399	Assembly, tilt brake	1
5.1		Bearing, thrust	1
5.2		Insert, tilt brake	1
5.3		Lock ring, M 16	1
5.4	RV4018-2015	Assembly, tilt brake lever	1
5.5		Tilt brake lever	1



Fig 6.5 Pro-6^{HDV} Pan and Tilt Head - LH Side Plate and Tilt (Cont)Brake

Item No.	Part No.	Nomenclature	Qty
5.6		Grub screw, dog point, M 4 x 10 mm long	1
6	RV4018-2017	Assembly, tilt drag knob	1
6.1		Grub screw, M 4 x 8mm long	1
6.2		Knob, tilt drag	1
6.3		Boot, tilt drag knob	1

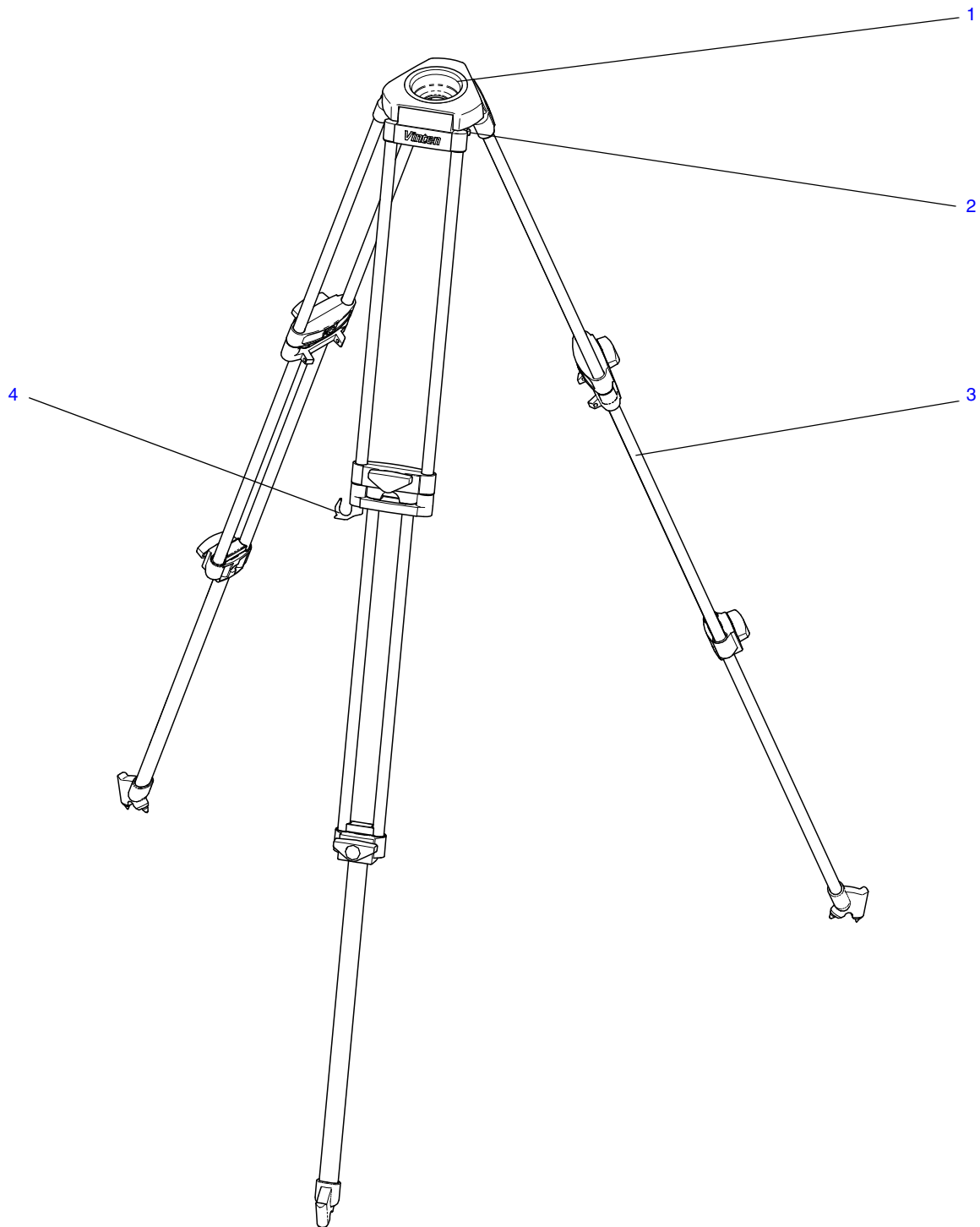
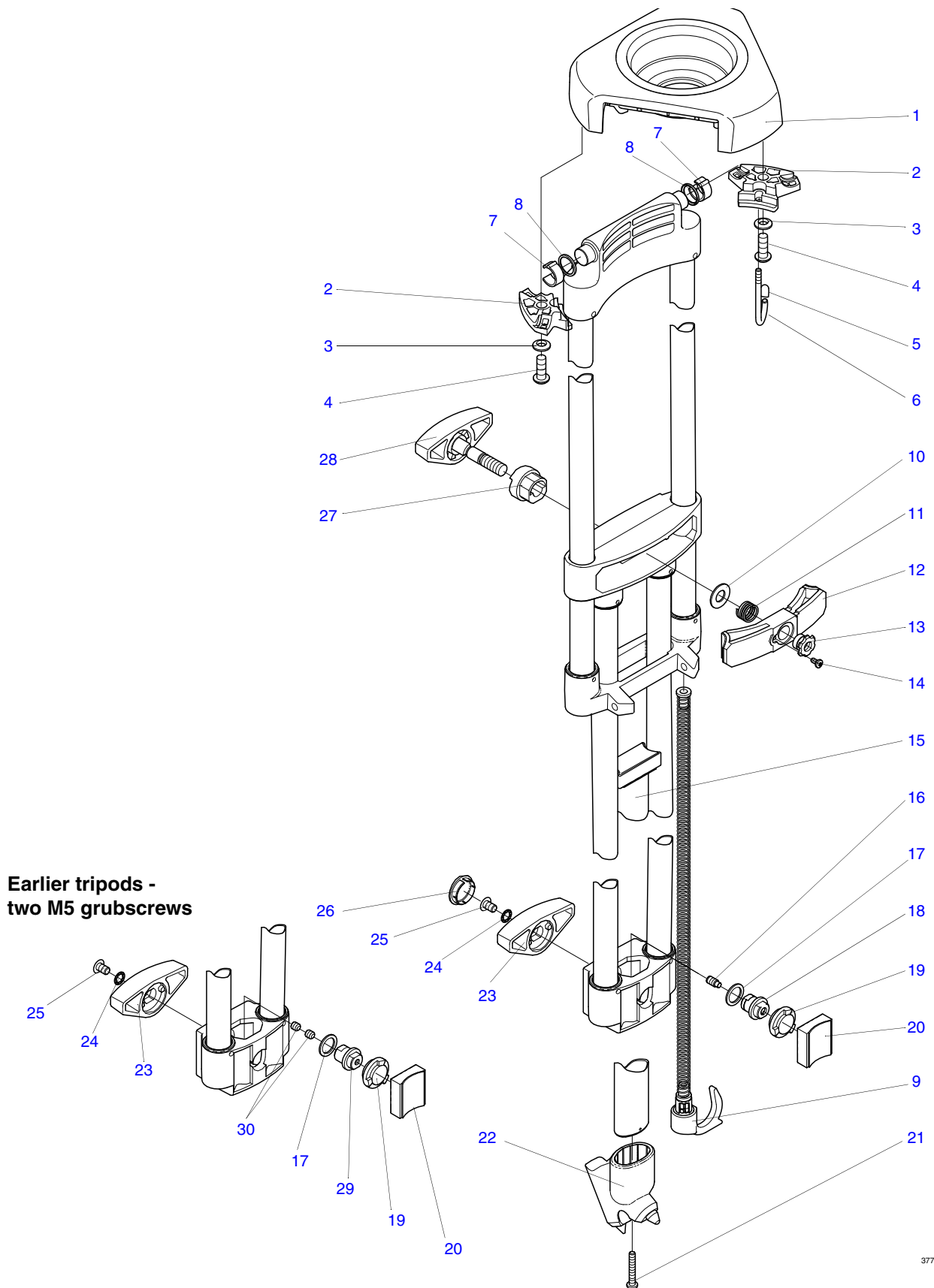


Fig 6.6 Pozi-Loc Two-Stage Tripod (3819-3)

Fig 6.6 Pozi-Loc Two-Stage Tripod (3819-3)

Item No.	Part No.	Nomenclature	Qty
1	3774-15	Bowl assembly (75mm)	1
2	3498-322	Hook	1
3	3819-11	Leg assembly (Fig 6.7)	3
4	3310-12	Strap assembly	1



3770_3_IP

Fig 6.7 Leg Assembly (3819-11)



Fig 6.7 Leg Assembly (3819-11)

Item No.	Part No.	Item	Qty
1	3774-15	Bowl assembly (75mm)	1
2	3498-321	Leg Pivot Clamp	3
3	3498-338	Spherical Washer	6
4	M007-506	Screw, button head, socket, M6 x 20 mm long	3
5	J550-112	Cap, tube, dome type, to fit over 3.2 mm diameter	1
6	3498-322	Hook	1
7	3498-226	Leg Pivot Friction Ring	6
8	3498-229	Leg Pivot Washer.	6
9	3310-12	Strap assembly	1
	3819-11	Leg assembly - replaceable parts as follows	
10	M600-106	Washer, plain, light, M8	1
11	J532-076	Spring, compression, 0.625 in. free length, 0.480 in. OD x 0.500 in. hole dia., 22.00 lbf/in. rate	1
12	3513-13	Upper clamp assembly	1
13	3392-205	Threaded insert (upper rear)	1
14	L101-026	Screw, self-tapping, pan head, pozidrive, M4 x 1/4 mm long, type bt	1
15	3819-901SP	Centre leg tube assembly	1
16	M006-813	Screw, grub, dog point, socket head, M5 x 10 mm long	1
17	3770-213	Washer-Lower clamp	1
18	3770-18	Clamp shaft assembly (lower)	1
19	3770-17	Clamp cam follower	1
20	3770-13	Lower clamp assembly	1
21	3770-16	Two-stage foot assembly	1
22	M101-003	Screw, self-tapping, pan head, pozidrive, M4 x 25 mm long	1
23	3770-229	Bottom Clamp Knob (Two Stops)	1
24	M601-010	Washer, shakeproof, internal, M5	1
25	M006-515	Screw, button head, socket, M5 x 8 mm long	1
26	3770-206	Knob cap	1
27	3770-219	Top clamp cam insert	1
28	3770-14	Upper clamp knob assembly	1



Fig 6.7 Leg Assembly (3819-11) (Cont)

Item No.	Part No.	Item	Qty
NOTE: The design of the bottom clamp has been modified At Serial No. 03515, the shaft was fitted with a locking thread insert and the 2 x M5 grubscrews, were changed to 1 x M5 x 10 mm			
Earlier tripods - two M5 grubscrews			
17	3770-213	Washer-Lower clamp	1
19	3770-17	Clamp cam follower	1
20	3880-17	Lower clamp cam assembly	1
23	3770-229	Bottom Clamp Knob (Two Stops)	1
24	M601-010	Washer, shakeproof, internal, M5	1
25	M006-515	Screw, button head, socket, M5 x 8 mm long	1
29	3770-231	Bottom Clamp Shaft (M5)	1
30	M006-814	Screw, grub, flat point, socket head, M5 x 5 mm long	2

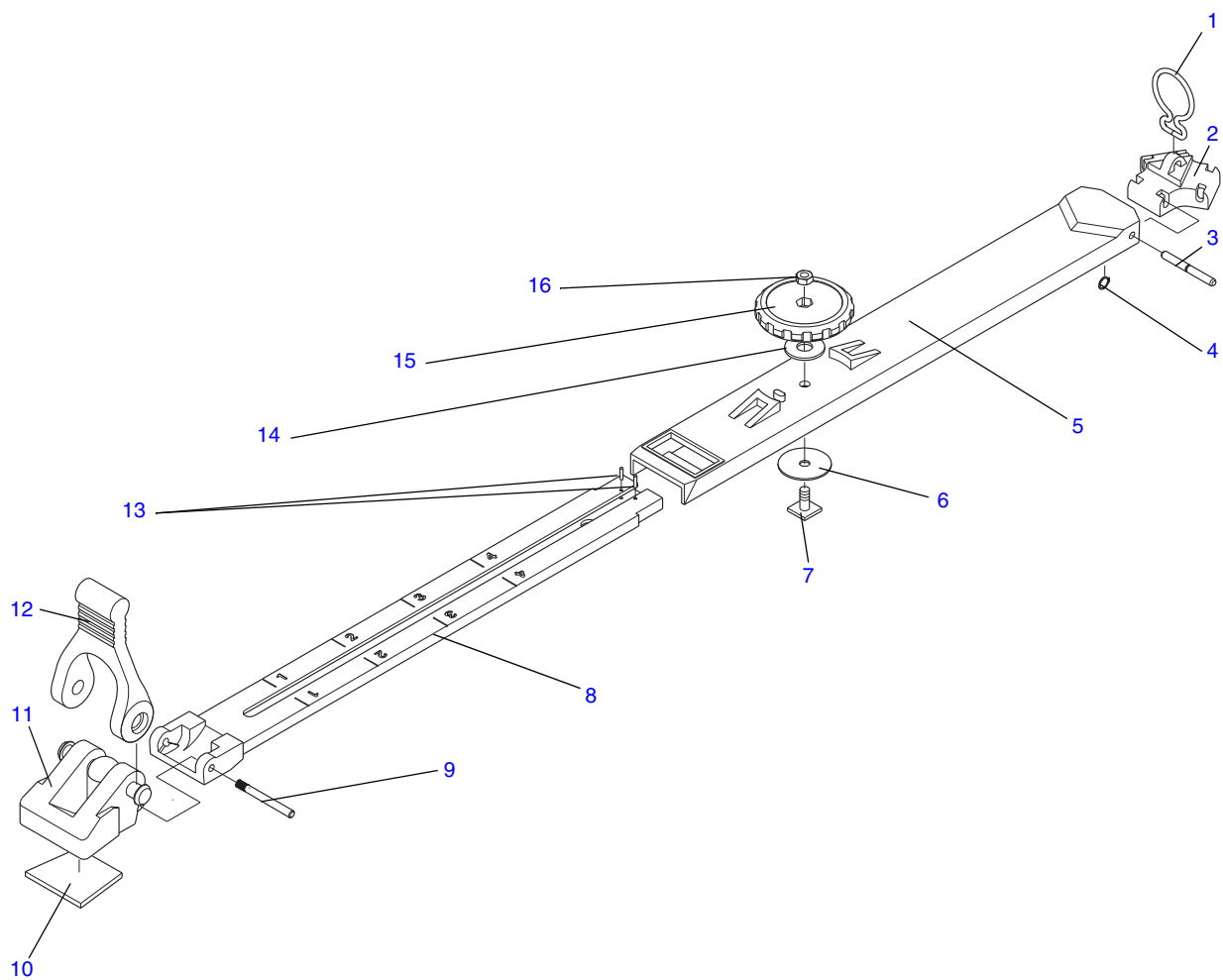


Fig 6.8 Floor Spreader (3818-3)



Fig 6.8 Floor Spreader (3818-3)

Item No.	Part No.	Nomenclature	Qty
1	3313-219	Split ring	1
2	3363-201	Centre moulding	1
3	3313-211	Hinge pin	3
4	M701-054	'E'-Clip, crescent ring ("e"-clip variation), 4 mm shaft dia. x 0.40 mm thick	3
5	3363-202	Leg moulding inner (female)	3
6	3313-214	Friction pad	3
7	3313-213	Clamp stud	3
8	3363-203	Leg moulding outer (male)	3
	3363-901SP	Foot assembly (spares) - black, comprising one each of:	3
9	3313-218	Foot hinge pin	3
10	3313-212	Foot pad	3
11	3363-215	Foot support moulding	3
12	3313-216	Strap	3
13	L803-002	Pin, mills, 1/16 in. dia. x 1/4 in. long, gp2	6
14	M600-020	Washer, form "c", large, 20.5/21 mm ID x 8.4/8.7 mm OD x 1.4/1.8 mm thick	3
15	3313-204	Clamp knob moulding	3
16	M500-081	Nut, M5, standard (hex), full	3

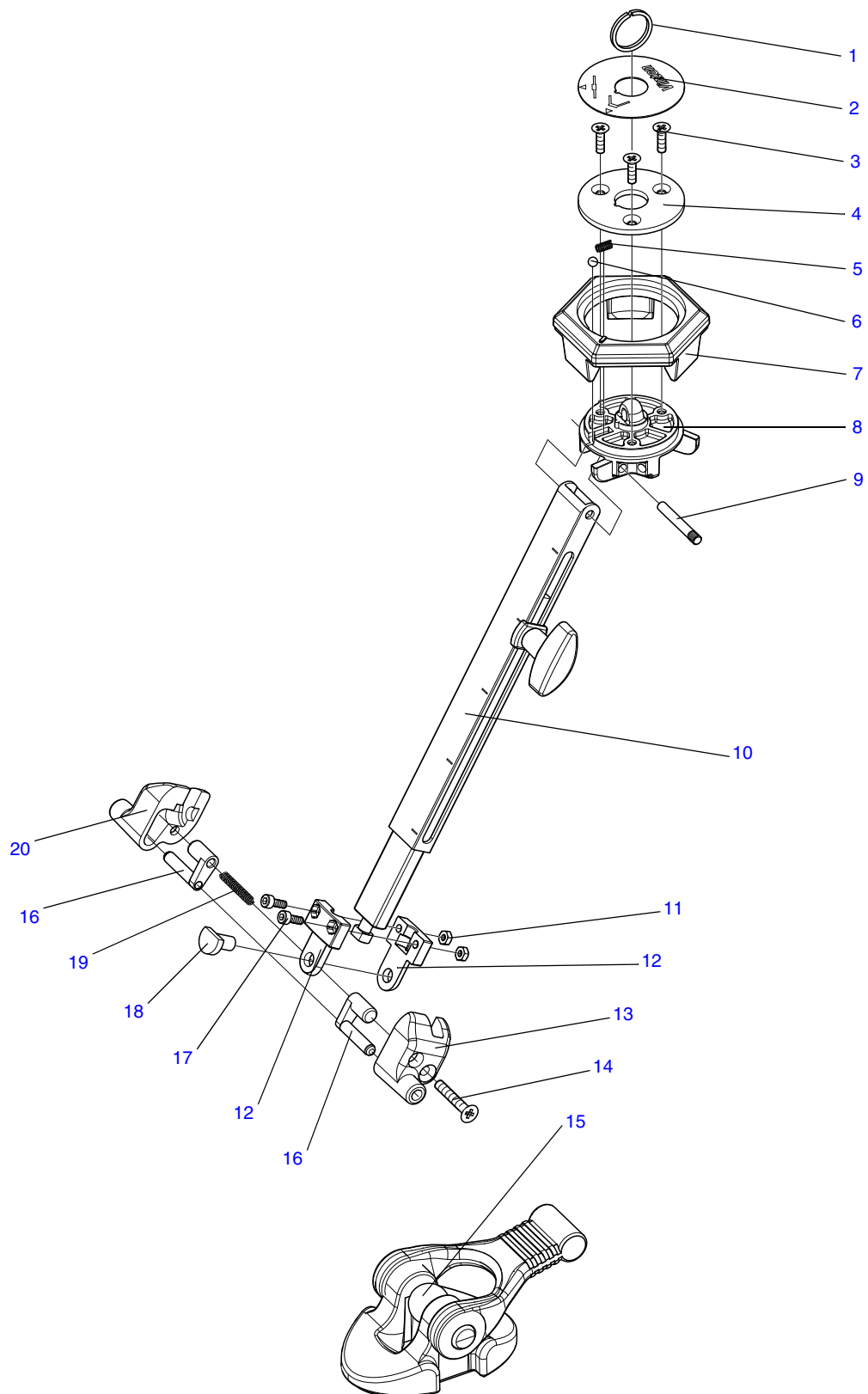


Fig 6.9 Mid-level Spreader (V4032-0001)



Fig 6.9 Mid-level Spreader (V4032-0001)

Item No.	Part No.	Nomenclature	Qty
1	M703-001	Key ring	1
2	V4032-2003	Label, selector cap	1
3	M101-013	Screw, self tapping, c'sk head, pozi, M 3.5 x 12 mm long	3
4	V4032-2002	Retaining disc	1
5	J532-067	Spring, compression, 3.5 mm OD, 2.71 mm ID x 25 mm long	1
6	P900-008	Ball, steel, 4 mm dia.	1
7	V4032-2001	Selector cap	1
8	V4032-2000	Pivot housing	1
9	V4032-2004	Pin, leg pivot	3
10	V4032-1002	Leg sub assembly	3
11	M500-061	Nut, M 3, standard (hex), full, black	6
12	V4032-2005	Pivot block, leg bar	6
13	3781-237	Tripod interface, left hand	3
14	M101-004	Screw, self tapping, c'sk head, torx, M 4 x 25 mm long	3
15	3781-14	Foot assembly	3
16	3781-20	Release lever	6
17	M004-717	Screw, cap head, socket, M 3 x 8 mm long	6
18	3781-246	Pivot shaft, tripod interface	3
19	J532-187	Spring, compression, 0.148 in. OD x 0.938 in. long	3
20	3781-238	Tripod interface, right hand	3